

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol. XXX: No. 4.

New York, Thursday, July 27, 1882.

\$2.50 a Year, Including Postage.
Single Copies, Ten Cents.

The Webb Compound Locomotive.

We present our readers this week with a carefully made engraving of the celebrated Webb compound locomotive, which has of late attracted so much attention in engineering circles. The engine is interesting, not only on account of the special features incorporated in its design and construction, but also because it embodies one of the first practical applications of the Joy valve gear.

advantage. There is no record of experiments to give a fixed value to the power absorbed by coupling two pairs of drivers together, but it has been held by many engineers, especially in England, to be an important item, and the original cost and the maintenance of the parallel rods are considerable matters.

As some dimensions of the Webb locomotive will undoubtedly interest many of our readers we append the following list:

A Continuous Hoop Train.

The several attempts which have been made to roll hoops on a continuous train have hitherto been baffled by numerous practical difficulties, and success appears to have been beyond reach. Mr. Reese, of Pittsburgh, however, claims that he is now able to construct a continuous hoop train which will possess all the requirements essential to success, and is prepared to furnish a train of

roll 6. The first pass is made between the rolls 3 and 4, and as the metal passes out of these rolls it is pushed through the Gearing guide rolls, and by means of a repeating trough into or between rolls 4 and 5. This repeater is made adjustable, so that the blank enters 4 and 5 an instant before the last end leaves 3 and 4. When the blank passes through 4 and 5 it is pushed through the edging rolls and repeater into or between rolls 5 and 6, and thence taken to 2 and 3,

finish. When the hoops come from the continuous train they are permitted to cool a little so that the scale may rise. They are then placed in the bull-heads and scraped. From the bull-heads the hoops are run out in a straight line in a finished condition.

The hoop train may be run at 500 revolutions per minute, which will give an output of 1000 feet per minute, and, as the train is practically continuous, with proper heating capacity, 800 feet of hoop should be put out

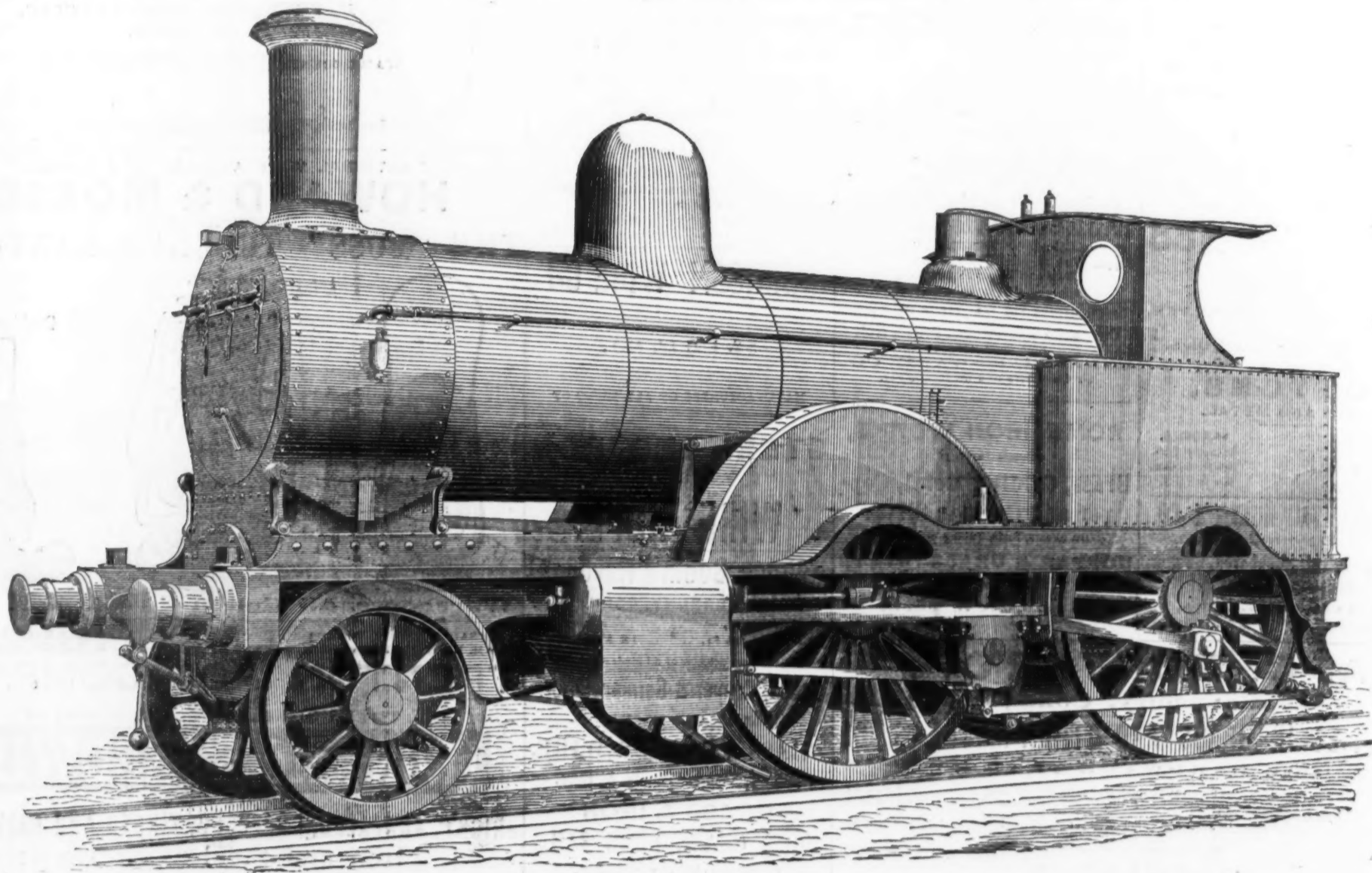


Fig. 1.—Perspective View—An Example Embodying Application of the Joy Valve Gear.

THE WEBB COMPOUND LOCOMOTIVE.

It is similar as regards boiler, wheels, &c., to the four-coupled express engines of the London and North Western Railway, England, differing from them, however, in several respects which were fully described in *The Iron Age* a short time since. Our recent account of the Joy valve gear, together with the illustrations in this number, will enable our readers to readily comprehend this important piece of engineering. The striking feature of the engine is that the drivers are not coupled, and the pair of outside connected high-pressure engines, which drive the back pair of driving wheels from one engine, are entirely separate and distinct from the single large low-pressure engine, which has its cylinder located under the smoke-box, and is connected solely to the forward pair of drivers. The only connection between the two engines is made by the rail and the exhaust, their valve motions being entirely independent of each other. The pair of outside cylinders are $11\frac{1}{2} \times 24$ inches, and the single low-pressure cylinder is 26 inches diameter by 24 inches stroke. The exhaust from the high-pressure cylinders passes first into a gridiron pipe receiver between the frames, and then up through a horseshoe of copper piping in the smoke-box, where it is dried and heated previous to entering the steam chest of the low-pressure cylinder. There is sufficient room in the piping between the engines to make the possible changes in the relative crank positions a matter of no importance, so far as volume and pressure of steam in the reservoir are concerned. The boiler pressure is about 125 pounds, and the reservoir pressure about 50 pounds. Although the two pairs of drivers are not coupled, the fact that one engine receives steam from the other goes far to obviate danger of slipping. If the high-pressure slips, the result is to increase the reservoir pressure and give more capacity to the low-pressure engine; if the forward drivers slip, the effect is to reduce the reservoir pressure, and thus give more capacity to the high-pressure engine. It is said that in practice no difficulty whatever is experienced from the independence of the driving axles, and the elimination of the parallel rods is certainly a very important

High-pressure cylinders.....	$11\frac{1}{2}$ by 24 in.
Low-pressure cylinder.....	26 by 24 in.
Diameter of leading wheels (radial).....	3 ft. 6 in.
Diameter of front driving wheels.....	6 ft. 6 in.
Diameter of back driving wheels.....	6 ft. 6 in.
Distance between center of front and back driving wheels.....	8 ft. 3 in.
Distance between front driving wheels and leading wheels.....	9 ft. 4 in.
Length of boiler barrel.....	26 ft. 10 in.
Mean outside diameter of the same.....	10 ft. 14 in.
Length of tubes between tube sheets.....	10 ft. 14 in.
Outside diameter of tubes.....	14 in.

this kind, put it in operation and guarantee its work. The hoop train as proposed by him, consists of one pair of six-high 8-inch pinion housing, and one pair of six-high 8-inch roll housing, together with six pinions, six rolls properly mounted in their respective housings, spindles, and boxes connecting the pinions with the rolls, guides, repeating troughs, and the usual bullheads placed at a distance of about 50 feet from the train.

and finally to 1 and 2, and from there run out in a straight direction to the bull-heads. The Gearing guide rolls are placed on the delivery side of each pair of rolls, so that the blank will be edge-rolled five times. When the rolls are placed in position Nos. 3 and 4 will be lined up for first pass, Nos. 4 and 5 for the second, Nos. 5 and 6 for the third, No. 2 and 3 for the fourth, and Nos. 1 and 2 for the fifth pass. No. 1 roll may be run by

per minute, which would be equal to 50 net tons of 1×16 hoop in 10 hours, or 100 tons in 20 hours. In practice this large amount of work could not be expected, but 50 tons per day of 20 hours of 1×16 is quite a moderate estimate of its production, and from 60 to 70 tons per day of oil barrel hoop, Mr. Reese says, can be made on this train, with proper heating capacity. It will be noticed that the blanks are rolled both on the lower and the upper faces of the rolls, except the top and the bottom rolls, by which means five passes are made with only six rolls. The advantages claimed for this hoop mill are: 1st, it dispenses with the rougher and catcher, and thus reduces the labor; 2d, it will produce double the amount of hoop of any mill now in use; 3d, the one set of rolls will make all sizes of hoops, thus dispensing with cost of changing for different widths and cost of different sizes of grooved rolls; 4th, the train is shorter and will occupy less room; 5th, the hoops will all be edge rolled, and but few hoops with ragged edges produced; 6th, the blanks will be finished better, will scale better, and produce hoops of a finer bluish surface. Additional information concerning the train will undoubtedly be gladly given by Mr. Reese.

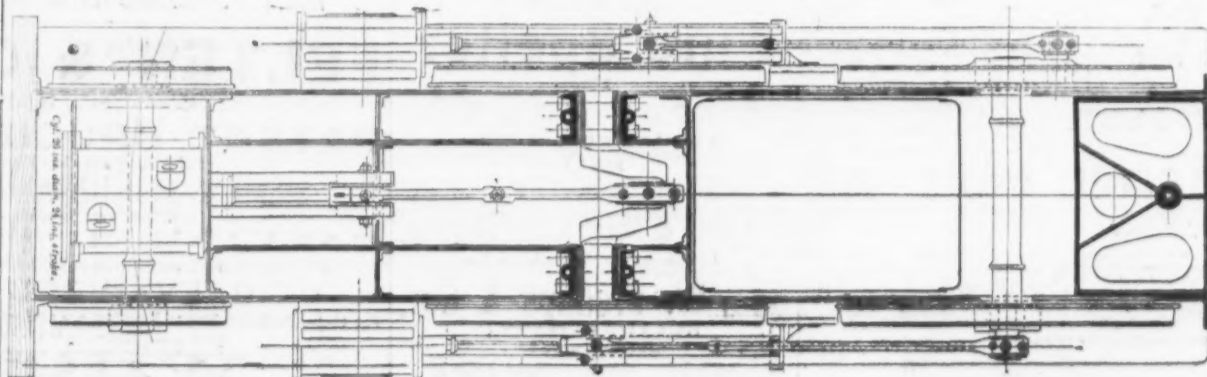


Fig. 2.—Ground Plan.

Number of tubes.....	198
Heating surface of tubes.....	980 sq. ft.
Heating surface of fire-box.....	103.5 sq. ft.
Total heating surface.....	1083.5 sq. ft.
Area of fire-grate.....	17.3 sq. ft.
Weight in working order on leading wheels.....	10 tons.
Weight on the front driving wheels.....	13 tons.
Weight on the back driving wheels.....	13 tons.
Total weight in working order.....	36 tons.

Mr. Webb expects to derive important advantages from the system of construction referred to, claiming, in the first place, that he can obtain all the advantages of a coupled engine without its disadvantages (such as frictional resistance of coupling rods, &c.), and that by using the steam successively in two engines—a great economy of fuel will result.

The pinions and rolls are 8 inches in diameter each, and the top of the housing is 5 feet 6 inches above the floor. The rolls may be made with box grooves or with tongue and groove, or they may be all smooth chilled rolls, and the edging done by using Gearing's guide edging rolls. Mr. Reese proposes to build the first mill with plain chilled rolls and the Gearing edging rolls, as with such a mill all sizes of hoops or skelp iron from 4 inches to $\frac{1}{2}$ inch wide, can be made on the same set of rolls, by simply adjusting the guide rolls.

In order to explain the working of the train, the bottom roll will be numbered 1, the succeeding rolls 2, 3, 4, 5, and the top

friction, if desired. All the other rolls are driven by spindles from the pinions. The main driving-power is attached to pinions on a line with roll No. 3. When the train is in working order the heater places the hot billet between rolls 3 and 4, when the blank is rolled on the flat and edged, and carried by the repeater into rolls 4 and 5. The same operation is performed in these rolls, as well as in 5 and 6, 3 and 4 and 1 and 2, being finally conducted by a straight trough to the bull-heads. The latter are so arranged as to permit the rolling of two hoops at once, for the reason that the continuous train, being automatic, will produce double the number of hoops that single pass bull-heads will

Holland's locomotive has actually made a trial trip and drawn a train. The daily papers contain long accounts of the matter, devoted chiefly to Holland's theory of combustion and the chemical reactions which take place between the incandescent fuel and the steam. The trip was 19 $\frac{1}{4}$ miles long, and the train arrived a minute and ten seconds ahead of schedule time, which, to the mind of any disinterested person, will show the immense advantage of Holland's engine and system of combustion over any other engine and combustion that has yet been built. Eighty-four gallons of oil were, according to Dr. Holland, used in this trip, the cost of which, according to the same authority, at 2 $\frac{1}{2}$ cents a gallon, would be \$2.10, which proves that he is an able mathematician. The visible advantages to an outsider who does not comprehend the elaborate descriptions of what is taking place in the fire-box, is that there is an absence of dust and cinders.

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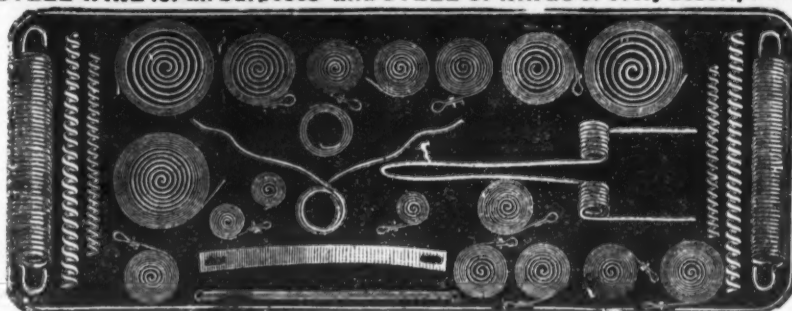


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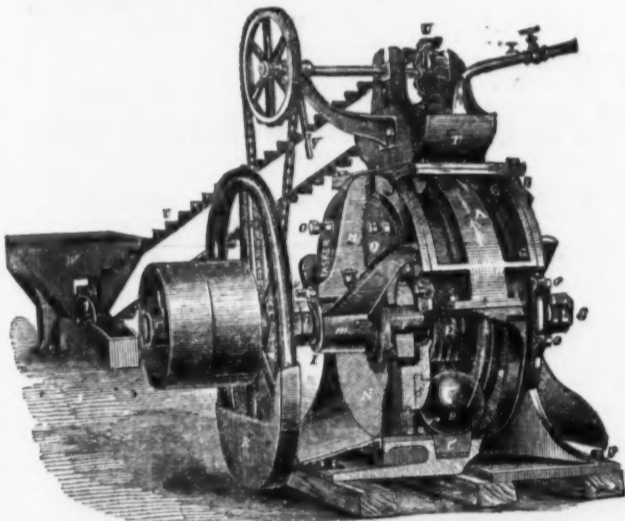
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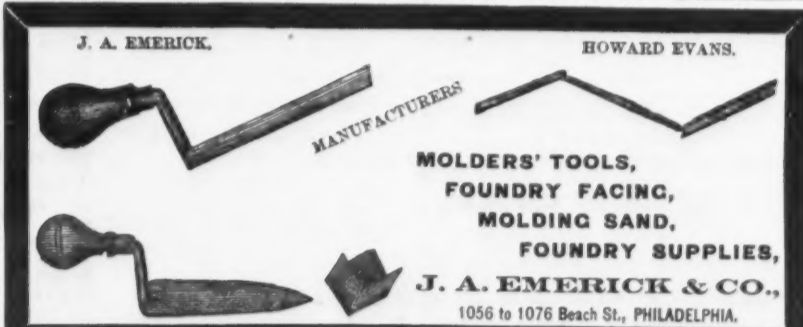
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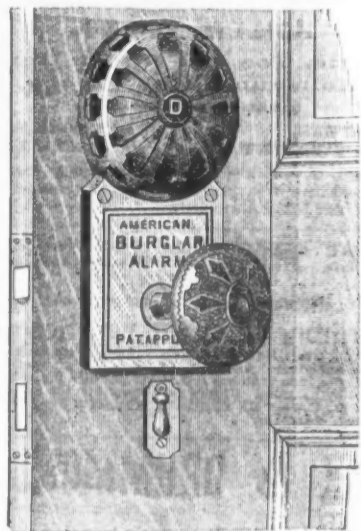
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Burglar Alarm for Attachment to an Ordinary Door Knob.

inside of a door, and to operate by means of the spindle of the ordinary lock. When placed upon a door in this manner, the latch or catch of the door cannot be moved without sounding the alarm. By slipping a lever provided for the purpose, the gong is silenced for the time being, allowing the door to be used without the constant alarm. By this means it will be seen that when the door is in use by the family, as in the daytime, the alarm need not be sounded, but on reversing the lever on retiring at night the alarm is fixed so as to make a noise whenever the knob of the lock is turned. It is so constructed that it will fit nearly every door, and, what is an advantage for those who do not live in their own property, can be put on and taken off from a door without defacing it. It is quite desirable for sleeping apartments, making it practically impossible for a thief to enter a room without arousing the occupants. The article, which is manufactured by Messrs. Decker & Denning, No. 116 Washington street, Chicago, is handsomely finished in nickel plate, and may be considered an ornament to the door to which it is attached.

Some Disputed Points in Foundry Bookkeeping.

Some attention has lately been attracted to two questions in foundry bookkeeping which, while simple enough to a practical accountant, seem to have given rise to some discussion among stove manufacturers. They are:

1. To the debit of what account should "discounts" go, and are they not as much a part of the cost of stoves as iron or labor?

2. Should the cost of patterns and flasks be charged in separate account and carried as part of the assets, or charged directly to the expense account?

The latter part of the first question is the one item for consideration. Are not discounts as much a part of the cost of stoves as iron or labor? This question is one upon which experienced manufacturers may take opposite sides and argue with all sincerity, the difference in their conclusions being for the most part dependent upon the standpoint from which the matter is viewed. The term "discounts" in the above connection we understand to mean the amount deducted from a selling price. It is quite customary in other lines of business as well as in the stove trade to sell goods at a certain price 30 days, 60 days, or even three months, with the understanding that 2 per cent., 5 per cent., or some other deduction will be made if cash is received within a certain specified number of days after date of invoice. The question which arises is, What is the nature of this deduction? Is it a part of the cost of the goods, or is it something of an entirely different nature? If it is a part of the cost of the goods, it evidently should be charged to some account representing the cost of production. In the simplest system of bookkeeping this would be directly to the debit of merchandise or manufactures, or whatever the general account is called representing the production of the establishment. If, however, this amount is not a part of the cost of the goods produced, it does not belong there, but should be charged to some account representing the expense of conducting business, or to an account called by whatever name it may be which stands for the cost of use of capital.

If a certain lot of stoves when manufactured are worth absolutely \$1000 in the warehouse and are sold for that sum in cash, there being no discount or deduction, the question does not arise at all. If, again, they, being still worth \$1000, are sold for \$1100, with a discount of nominally 10 per cent., simply for the purpose of reducing the bill to a fair cash basis, the charge for the deduction evidently goes to the debit of the account which has received a credit in excess of what was right, in order to equalize matters. If, however, the goods being worth \$1000, cash, are put at \$1000, 2 per cent. off, in order to convert them into ready money because the concern wants capital, still another set of conditions must be taken into account. These several examples, it seems to us, throw enough light upon the subject to indicate the direction of a correct solution to the question. In considering each of these cases, we have based our calculations on the actual value of the goods in the market. Nothing has been said about cost of production, and we would remark parenthetically, that ordinarily the cost of production has very little influence upon the selling price of goods in the market. The question is, What can I get for my product? Then, How can I reduce my cost so as to sell it at market

rates and still make a profit? It is very seldom that the order of these questions is reversed, and that the calculations are made, first, as to the cost, and then as to a selling price based upon a definite percentage of advance upon cost. Given, a certain lot of goods ready for the market; they have a certain value dependent upon general market conditions. Any discount that is made from the price set upon them becomes, therefore, one of two things: It is an abatement to meet the market, or else a deduction to induce cash payment, because the cash is wanted. Therefore the account to be charged with the discount becomes either the merchandise account, not because the discount is a part of the cost of manufacture, but because the credit received by it was originally too great, and must be reduced to equalize things; or, it becomes a discount, or interest account, called by whatever name it may be, representing the price paid by the concern for the use of capital furnished by the purchaser of the goods.

There are other discounts entering into the business transactions of a stove founder, among which may be mentioned those in connection with the purchase of pig iron. It is customary to buy iron at a certain figure, four months, with the understanding that, if cash is paid, a discount will be made. We have already referred to this question in the columns of *The Metal Worker*, and have advanced the opinion that the difference between the cash value of the material bought and price paid for the four months was an interest charge. In other words, it was the sum which the concern was paying for the use of that much capital. It is recognized in the accounts of the most advanced concerns that everything must be reduced to a cash basis in order to obtain a common measure of comparison. Take, for example, life insurance, which probably embraces the most scientific system of accounts and values known at the present time. In it, it is customary to reduce everything to a cash basis, in order to present statements of results and actual conditions. In the question under consideration, we think the true solution to the problem will be found in estimating everything at a cash basis, and charging whatever difference there is between cash and the actual amount paid to an account which represents the use of capital. This rule is a broad one, and much might be said about it. There are, however, various side issues that arise. The final solution and the method adopted in any individual concern will depend very much upon the ability of the accountant or business manager to grasp some of the subtleties of business calculations. Books of accounts are, in a certain sense, indications of comparative results rather than absolute statements. For example, it makes very little difference to a proprietor at the end of the year, whose net profits, for example, have been \$20,000, whether the amount has been actually earned in the foundry, or whether a certain portion of it has been gained by judicious manipulation in the way of purchases and sales. On general principles, he will assume that careful management in the foundry has made some profit, and that careful business manipulation has not only taken care of that profit, but added to it; but just how much has come from either source, if he be a man who manages upon general principles rather than specific details, he will care very little. We hold, however, that it is to the interest of every man to know just where he is gaining and where he is losing, and to be able to analyze his business in such a manner as to give particular attention to those departments that most need his supervision.

The second question proposed above—should the cost of patterns and flasks be charged in a separate account and carried as part of the assets of the concern or should they be charged directly to the expense account of the establishment—is very easy of answer. It depends entirely upon the facts of the case. At the end of a year's business do the flasks, patterns and follow-boards represent an actual value, or do they not? Have they been entirely superseded, or will they still be in use for the succeeding year's business? Probably, in the present state of trade, the middle ground is the safe one to pursue. The constant change in styles ordinarily wipes out the value of the patterns made each year. Whatever styles are produced this year are calculated for this year's business alone. Something else will be the leading style next year, and so it goes. However, the patterns which are produced this year will have some use in the business next year, and possibly the year following, even though they are not by any means leaders. The question of repairs—the old plates that are to be furnished at some future time—must also be taken into consideration. The proper answer to the question therefore becomes very simple of statement. Let each year's business bear that proportion of the cost of patterns and flasks that properly belongs to it. Let a fair estimate be placed upon the patterns at the end of the year, and let the amount so determined be entered upon the inventory, the balance of the cost being borne by the current year's business. At best, this is only an estimate, and since estimates are always liable to error, it is well to err upon the safe side. Better make the value of the patterns and flasks remaining on hand too small than too large. In no sense can they be considered desirable assets in case the business is to be closed out. The value of patterns and flasks, to the extent of a very large percentage, whatever the estimated amount may be, depends upon the perpetuation of the business under the same management. It is, therefore, simply a question of accounts, partnership settlements, of a fair division of cost between one year's business and another, and the discriminating business manager will see the problem clearly in this light, and solve it accordingly.

Malarial Foundations.—The San Francisco Bulletin, commenting upon some of the foundations in existence in that city, makes the following statements: Many of our business houses and nearly the entire residence portion of our city are composed of wooden structures built on foundations of similar material. In a few years, floors begin to settle, cracks appear in walls, and owners, becoming alarmed, consult their architects, who, upon examination, pronounce the found-

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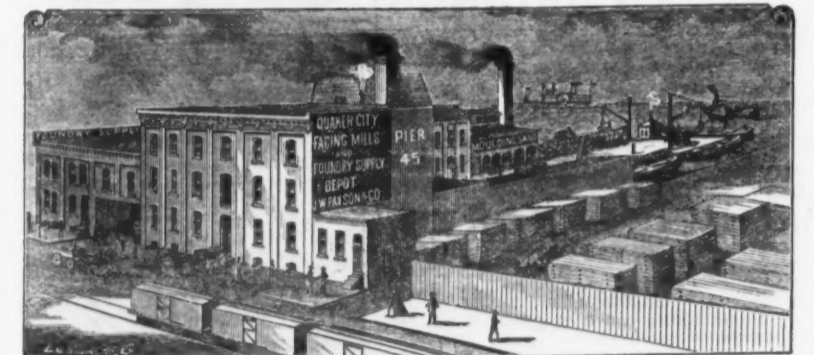
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Charcoal Bloom and Pig a specialty.

dations as rotting and entirely unsafe in up-
holding the superstructure. Then trouble
begins. The underpinnings have to be
taken out and brick supports placed in proper
position. A correspondent who has given
some attention to the subject, informs us
that recent scientific investigation developed
the fact that the wood used for foundation
purposes becomes decayed by contact with
the sand, which destroys its fiber, leaving it
porous, brittle and of no value. A fungus
growth starts from the edge of the decaying
wood, and is composed of myriads of in-
finitesimal insect life, which burrows and honey-
combs the remaining wood until its vitality
is gone and the insect itself yields up its life
in the wreck of matter. This decaying mass
creates a vast deal of malaria, and physicians
trace many of the noxious odors and fever-
breeding troubles to the festering condition
of the underground portion of residences.
It has been proved beyond question that
when proper foundations are placed beneath
such structures the malarial atmosphere
largely ceases to exist, while the occupants
are relieved of certain feverish attacks, pre-
viously frequent. To parties intending build-
ing, this matter is of much importance, and
it is suggested that true economy would war-
rant the increased expense of a brick founda-
tion over that of a wooden one. Nearly
all buildings of any value are now being
erected on brick foundations, and it is pre-
sumable that only the cheapest kind of dwell-
ings will be placed on any other basis.

The Iron Mountain in St. Domingo.

Mr. Gabb, in the transaction of the Ameri-
can Philosophical Society, gives an interest-
ing summary and detailed description of the
topography, geology and resources of the
eastern half of the island of St. Domingo,
where he spent three years in exploring.
The iron mountain of Hatillo is on the south
bank of the Maimon; it is a rounded hill
somewhat over 100 feet high, several hun-
dred feet long, and, in all, about 300 feet
across, from the Savanna on one side to the
base on the other, almost touching the river
bank. The side nearest the river is a solid
mass of limestone, nearly resembling marble,
while the southern half is a nearly solid mass
of a very compact magnetic iron, several
pieces having contained from 67 to 68 per
cent. of metallic iron, according to the
analyses of Professor Chandler, of the Colum-
bia College School of Mines, of this city.
Thousands of tons lie scattered over the sur-
face or imbedded in the soil, only requiring
to be picked up. There is no section exposed
whereby its character can be ascertained,
and without excavation it would be hazard-
ous to venture an opinion as to whether it is
a vein or simply a lenticular mass. The latter
seems the more probable hypothesis, since
the outcrop is so limited longitudinally, and
judging from analogy with similar masses in
the United States. Beyond the hill all signs
of metal disappear on the surface, except
such stray blocks as can with a greater show
of probability be attributed to the hill itself.
But for all practical purposes the iron moun-
tain is an inexhaustible mine. Its advan-
tages are enhanced by its proximity to a na-
vigable stream, the nearness of limestone, and
by its being in the heart of a great forest
where unlimited supplies of hard wood can
be made to yield all the fuel required for fur-
naces. Nor is this hill the only deposit of
the mineral in the vicinity. Mr. Gabb vis-
ited one other, about three miles distant,
where the quantity of iron was still greater,
but although equally well situated with re-
ference to flux and fuel, its facilities for
transportation are not so good. It is on the
opposite (north) side of the Maimon Valley,
in the hills, and where a railroad could be
made without difficulty to the river; but the
three miles more or less of land carriage,
though trifling, is a comparative disadvan-
tage. It is a curious sight to see, as in that
case, a mountain stream, tumbling and
splashing down a steep ravine, under, around
and over great boulders, many of them sev-
eral feet in diameter, and all of them solid,
black ironstone of the finest quality. Mr.
Gabb was told that other equally valuable
"iron mines," to the number of three or four,
were known in the vicinity, but since he
could not obtain guides no reliable infor-
mation concerning them was obtained.

Master Mechanics' Report on a Stand-
ard Wire Gauge.

The report of the committee on the stand-
ard wire gauge of the American Master Me-
chanics' Association, by Mr. R. H. Briggs,
is especially interesting. Were it not for its
great length, we should like to give it entire.
Some of the matter, however, has been laid
before our readers in other forms. After
speaking of the importance of a standard
gauge, Mr. Briggs introduces the following
letter from Mr. Coleman Sellers, of Philadel-
phia, in which a preference is expressed for
the "American," or Brown & Sharpe wire
gauge, if a gauge must be used:

I think that plates should be rated by
their thickness in inches and the decimal
of an inch, conforming as far as
possible to the existing division of the
inch by the binary division. Thus 1/2-
inch, 1/4-inch, 1/8-inch plates, answer the pur-
pose of the trade and the purpose of calcu-
lated strength better than the expression of
the thickness of the pieces in a gauge, which
spaces must be translated into inches before
they can be used in computations. When we
get below 1-16th inch it may be well to have
some gauge, but even in this case I am in-
clined to favor the use of the small plate
gauge with screw, made by Brown & Sharpe,
and the expression of all thickness by the
thousandth of an inch. I do not believe in
this thing of a gauge founded on a French
measure, because I hope the craze for that
system is on the decrease, and that in Amer-
ica we will never adopt the French system.
I expressed my views on this matter in a
paper read before our Association of Me-
chanical Engineers some years ago. I re-
fer you to it for what I think, and I now sup-
plement that paper by one which I read be-
fore the American Society of Mechanical En-
gineers last year, and of which paper I now
send by the same mail a copy to you to refer
to if you are inclined. I am sorry I can do
so little to aid you on this subject, and trust

A. H. McNEAL,

BURLINGTON, N. J.



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For Circular, Muley, Mill, Gang, Drag, Pit and Cross-Cut Saws.

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For Springs, Billet Web and Hand Saws, Shovels, Cotton Gin Saws, Stamping Cold, &c., &c.

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For Boilers, Fire-Boxes, Smoke Stacks, Tanks, &c.

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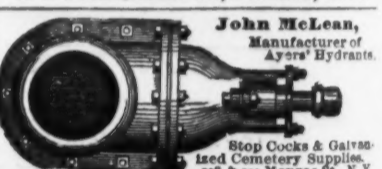
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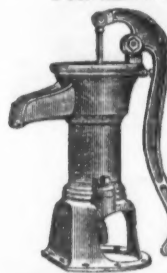
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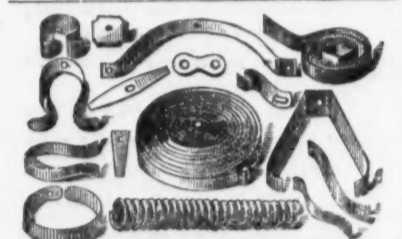
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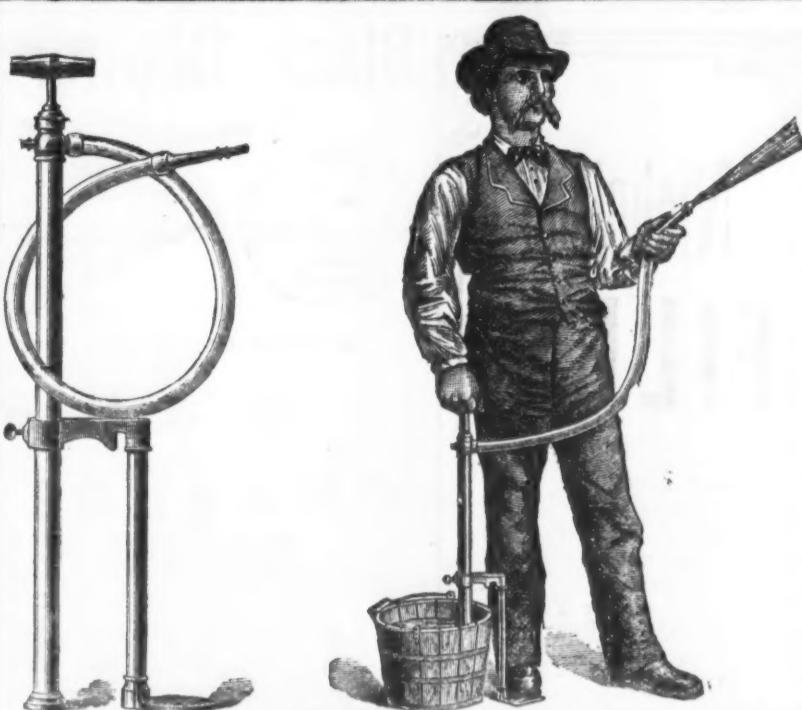
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Made from their own Pig Iron, insuring regularity and superiority in quality.

Also, **FOUNDRY AND FORGE****PIG IRON,**

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Manufacturers of

SEAMLESS DRAWN BRASS & COPPER TUBES,
BRIDGEWATER HORSE NAILS, 3d. FINE NAILS,

Track Plates and Forgings of Every Description.

NAHUM STETSON, Jr., Agent, 73 Pearl Street, New York.that what I have given you will in some way help you in getting what you want. Please command me if I can answer any specific questions in the matter, and believe me, my dear sir, Yours truly,
COLEMAN SELLERS, of Phila.

Following his letter is another one from Mr. Edward S. Page, of the Cleveland Rolling Mill Co., who, in regard to this matter of wire gauges, says: "We have for the last 10 years been in the habit of using what is known as the 'American standard wire gauge,' by which we draw our wire and roll our sheet and plate. This gauge we know is used by a large proportion of American manufacturers, and although we do draw our wire to other gauges, which are specified as English gauges (the Birmingham gauge, Brown & Sharpe's gauge, and Stubbs' gauge), still we are in the habit of asking from our customers samples of what they require, showing the gauge. We would much prefer to have one gauge used by all consumers in this country, to be known as the 'American standard wire gauge,' but we know of no way, perhaps, by which this could be brought about, except through your association."

A quotation is then made from Miller, Metcalf & Parkin's Treatise on Gauges, in which a table is given showing the relative sizes, in decimals of an inch, of the London, Stubbs, and Brown & Sharpe gauges. One point here is to be noticed, in order to prevent people from being deceived in regard to tables of this kind. The dimensions of both the London and the Stubbs gauges are given to thousandths of an inch, from which it would seem that the exact sizes of each one of the different numbers is known. This is not, however, the case. These English gauges vary among themselves as much as they do from the American standard wire gauge of Brown & Sharpe, and it is not infrequent to find two of these from the same maker, supposed to be alike, differing from each other more than the difference between two successive numbers; the folly, therefore, of using them under any circumstances should be apparent to any one. When we consider the fact that the gauges do not meet the wants of the trade from a lack of numbers, the following extract is especially worth consideration:

"How is it possible for a roller to know just how many millions of an inch another man, whom he never saw, means when he says, No. 28 'full,' or No. 27 'easy'?" And how is he to guess how many thousandths of an inch the other man's gauge is wrong in its make, or how many hundredths it has worn in years of steady use? This is no fancy sketch. The above are every-day difficulties in this age, when every man knows just what he wants and will have nothing else, and yet has no better way of telling his wants than to say, 'I want such a gauge tight,' when probably his gauge differs from every other gauge that was ever made."

Mr. Briggs says in conclusion: "I hope, Mr. President and gentlemen, that this matter will receive the consideration from this association that it deserves, and that you will honor yourselves by adopting a truly American standard gauge. And in view of that end, I most respectfully recommend for adoption the micrometer gauge made by the Brown & Sharpe Manufacturing Company, Providence, R. I. First, for accuracy in measurement; second, for ease of adjustment; and third, for its durability. It measures by the thousandths of an inch very accurately, is very simple in construction, and special sizes can be made, suitable for tool work, when so required."

New York Industries.

The census bulletin, which gives the statistics of manufactures in 20 principal cities of the Union, shows that New York is now the most important manufacturing city in the country. Though the capital invested in manufacturing enterprises in Philadelphia slightly exceeds New York figures, the amounts being \$170,495,191 and \$164,917,856 respectively, we employ 217,937 hands, against only 173,862 in Philadelphia. During the census year, from June 1, 1879, to May 31, 1880, a total of \$93,378,806 in wages was paid in this city, against \$60,606,287 in Philadelphia, and the value of the material used was \$275,099,236, yielding a manufactured product valued at \$448,209,248. Philadelphia in this case also occupies a lower rank, and it is found that in both cities a little more than 61 per cent. is added to the value of the raw material by the process of manufacture. Considered in respect to the amount of money employed, the business of making men's clothing stands at the head of the manufactures of New York, the capital thus used being \$22,396,893. The number of hands employed in this branch of our manufactures is 47,650, and the value of the finished product \$60,798,607. Printing and publishing stands next, with a capital of \$14,774,029. These two are the only kinds of manufacture in which more than \$10,000,000 is invested. The greatest ratio of increase in value under manipulation of the material employed is in the case of steel engraving, \$13,709 worth of material being made worth \$218,305. The makers of artificial limbs give a value of \$44,620 to \$6056 worth of material. There are several other branches of manufacture, as the making of combs, of hosiery and knit goods, of instruments for scientific or professional use, and enameling, in which the ratio of increase in value far exceeds the average of the whole list taken together. For large value of the product in proportion to the number of hands employed, the drug and chemical business is conspicuous, the value given being \$3,604,178, and the number of hands 588. In cork cutting 11 establishments, employing 65 hands, turn out \$121,148 worth of the manufactured article, the material being more than doubled in value. The highest rate of wages paid is in steel engraving, the average yearly compensation being \$1010.

The number of male hands employed during the year in question was 140,111; of females above 15 years, 68,038; of children and youths, 8928. The employment of children under the age of 15 years in factories is obviously an evil, and it is gratifying to observe that in this respect we make a bet-

ter showing than the city of Philadelphia, where 14,350 children and youths are thus employed, although the number of adults of both sexes in the factories of that city is 34,000 fewer than here. In some occupations the number of female hands exceeds that of male hands, as in the making of artificial flowers and feathers, of bags, book-binding, paper-box making, on women's clothing, on men's furnishing goods, and a few others of a similar character. Among the plumbers and gas-fitters 1 woman and 118 children are reported. Silk and silk goods claim the largest number of children—1435. The next largest number employed is in paper-hangings, a manufacture which is reckoned among those dangerous to health. The cigar manufacturers employ 16,088 men, 9423 women and 478 children. In what may be called the artistic occupations of wood and steel engraving, hair work and photography, the number of women employed is about two-thirds that of the men. There are 4 establishments for the manufacture of oleomargarine, employing a capital of \$610,500, 248 male hands, using \$4,322,595 worth of material, and turning out a product valued at \$5,215,393. The average yearly earnings of the 217,937 men, women and children employed in the 11,162 manufacturing establishments of all kinds in the city are \$428.92.

Measurements of Water-Wheel Power.

Paper makers are not the only men who have been disappointed in the amount of power consumed by their machinery, when, by means of exact measurements, they have found out precisely what that power is. Other manufacturers have been misled in this respect, sometimes to their great cost; but it may be that paper mills have been specially troubled because of the real difficulty of measuring the power of the wheels, by which, in years past, so large a proportion of them have been run.

Strictly speaking, the measurement of the actual discharge of a water-wheel is not a troublesome thing, when it can be set up in proper shape, for the express purpose of having the discharge measured, but when the wheel is in place, either alone or by the side of others in actual conditions of working, this measurement becomes a very different matter, and, in fact, quite impracticable; so, too, the attachment of a dynamometer to the wheel-shaft, or to some similar convenient part, involves so much trouble and so important an uncertainty in the interpretation of its results, that in practice it is never done.

The manufacturer is, therefore, left in the dark, except as he may be able to judge of his work by what he may have seen, or by what others tell him, of the measurement of the steam power needed to do similar work, perhaps, the same work, or to be more exact, what appears to be the same work, for appearances are, at times, extremely deceitful in such things. A wheel is called a sturdy running wheel, an unequalled developer of power, and sometimes by even more inexact names, when, in reality, the only thing known is that in doing such and such items of work, which may or may not be the same as those done elsewhere, a wheel may be wasting from leakage an important part of what is supposed to pass effectively through it, or there may be some unsuspected loss due to uneven wear below the limit of convenient examination and repair. In fact, a wide variety of causes renders it a very troublesome job to measure, and still more to estimate, the real effective power of a wheel when taken in the ordinary conditions of practice, as shown in the average water-power mill.

The only consideration that can be offered in explanation of so much apparent neglect is the fact that water-power is cheap, that it pays better to let the wheel alone as long as it does the work, rather than to lose the time and spend the money to examine it and to overhaul it if it were found in bad order. This may be a good plea for a water-wheel, but it would be rejected if offered to a mill owner as sufficient reason for failing or refusing to examine any other part of his business, so that he might know absolutely concerning it that it was right and in perfect order. The worst feature, probably, about this willingness to go it blind is the serious chance which, in scores of cases, has proved a certainty that the wheel, or the department of the business, will be let run so long that when absolute failure or slackening of speed does occur, it is at the instant when every nerve of the establishment is strained to its utmost, and must be, to meet engagements, and when the inevitable loss due to the needful repair may become tenfold, or even more, what it need be if the time for examination and repair had been deliberately chosen. One danger, too, in this regard is that time may be really lost in hunting for the trouble, or the slowing of the speed, in the wrong place, so long as the general principle is held to that while the wheel will run it is in itself all right.

These general considerations, of course, have nothing to do with the size of the wheel, being as true for one as for another, though the larger the wheel the greater the loss when it is really out of adjustment. So long, however, as some very profitable lines of business depend upon small or medium sized wheels, so long even the smallest wheels should be kept sharply up to their work. The real cost to a mill of a badly kept or worn-out wheel may very easily become that due to a loss of one or two hours' run, when water is low, and the wheel must be fed from that which has been stored up during the night while the mill wheel is idle, and the obtaining of this one or two hours' run, or its loss, may easily make the difference, for weeks at a time, between a profit and a loss to the whole establishment. A reduction of output of 20 per cent., or even of 10, is apt to be a burden that no mill can stand when charged against its current business. These questions do not relate directly, it is true, to the quantity of power developed by a wheel, or to the other query suggested as to whether this quantity is really known, but the whole is summed up in the general term, the "efficiency" of the wheel, and thus one quite includes the other.

It may be said that no manufacturer would expect to run his mill so close up to the margin of his water-power as to be stranded, or embarrassed, by the failure of his pond at 5

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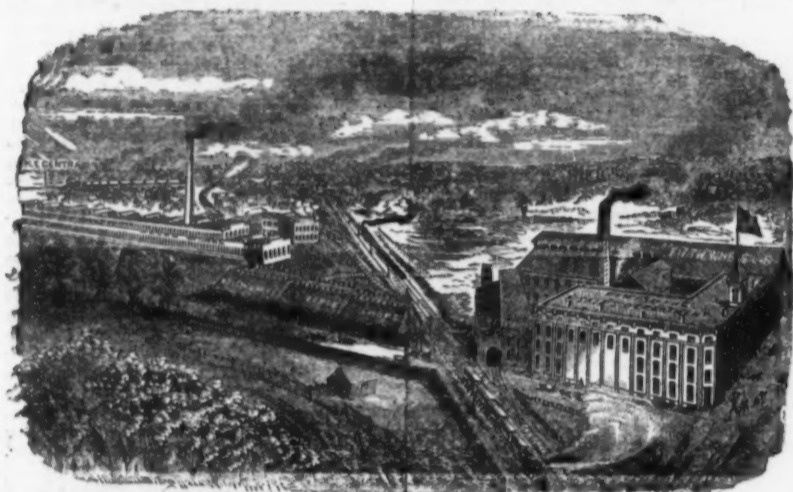
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We offer this Sweeper with confidence, knowing it to be the best in the market.

PRICE, \$30 PER DOZEN.

Liberal discount to the trade. Send a sample order.

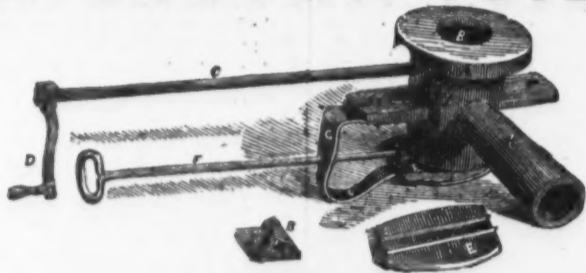
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Handsaw (Double-End),
Handsaw Taper, single cut,
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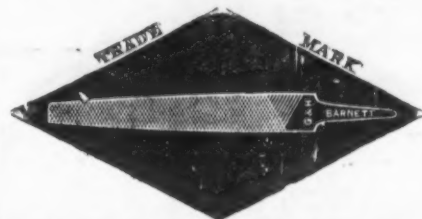
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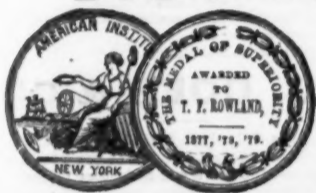
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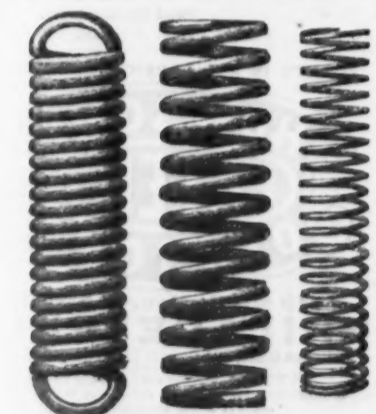


Face in one piece, of BEST TOOL CAST STEEL. PERFECTLY WELDED, perfectly true; of hardest temper and never to come off or "settle." It does not bounce the hammer back, and therefore can do more work with lighter hammer. Horn of tough untempered steel, never to break or bend. Only Anvil made in United States fully warranted as above. None genuine without our trade-mark.

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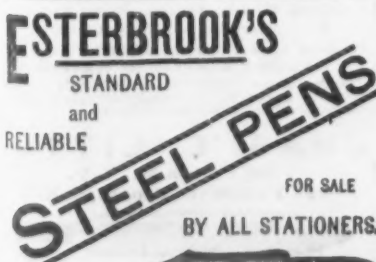
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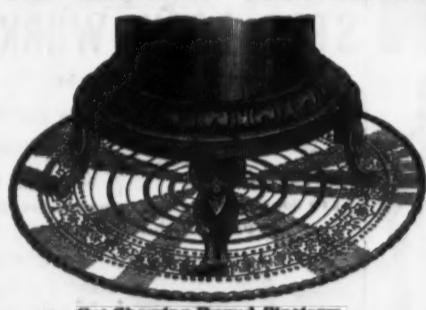
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THE ANSONIA CORRUGATED STOVE PLATFORM

With Patented O. G. Border.



ROUND, SQUARE AND OB-
LONG, IN ALL SIZES.

Manufactured of heavy metal, requiring
no nailing or lining, the edge retaining its
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Price as low as any.

Send for List and Discount.

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For Magnets, Telegraphs, Telephones, &c.

Insulated on the bare wire with H. Splidoff's patented Liquid Insulation, covered with cotton or silk.
All sizes of Bare and Covered Wire in Stock.
The conductivity of every bundle tested and warranted.

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For Clocks, Indicators, Telephones, Call Bells, Bell Punches, Steamboat and
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ESSEX HORSE NAILS.

Hot Forged, from Norway Iron, Warranted Best Quality, Pointed and Polished.

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p. m., when he needs to run until 6, and that he would be sure to provide steam-power to run by long before his storage areas had been so completely drained. While this may be true with many men, perhaps with most, it is still true that the suggestion is worth making to one man, or the two out of ten, whose wheels are in the very condition described, that of wasting during the day the water that would have run them during the last one or two hours.

Those manufacturers are fortunate, and the water-wheel builders are too, who have the opportunity to measure the power of their wheels by the ready transfer of their load to a good steam engine, to which have been fitted the simple fixtures for determining the load upon the engine at any required moment. These measurements of water-wheel loads have caused some surprises, as genuine and complete as have ever fallen to the lot of any builder of machinery, for their accuracy cannot be questioned, and they have been known to show that the wheels were rated, and were supposed to be running, to a horse-power far above that which the engine showed the load to be when transferred to it.

All these considerations show, or ought to show, to a thinking man, that comparisons should be diligently made of the work done by a water-wheel, not only as compared with another wheel which is believed to be doing the same work, but what is much more important, as compared with the absolute standard for that particular wheel in its own particular place. These things are not always easy to do, but the more difficult a task of this sort becomes the more certain it is that it ought to be undertaken at any probable cost.

INDUSTRIAL ITEMS.

MAINE.

The Hardy Machine Company, Biddeford, manufacturers of card grinders and card grinding machinery, are doing a rushing business, and their business is double that of a year ago.

The rolling mills at Cape Elizabeth have resumed, and they have orders ahead that will keep them at work without interruption until Christmas.

MASSACHUSETTS.

The Cape Ann Forge Works, at Gloucester, W. N. Fisher agent and superintendent, and M. T. Denham, secretary, are doing a good business. The new hammer, put in a year ago, gives perfect satisfaction, and is a tool that was long needed by them. It is probably the best hammer in New England for medium-class forgings. They have many conveniences and appliances for handling heavy work, by which they save labor and lessen the price of work.

The addition to the American Tack Co.'s factory, at Fairhaven, has been commenced. It is to be of stone, 90 x 36 feet, and three stories high.

The Whitehead & Atherton Machine Company, of Lowell, have been obliged to run their works nights in order to meet the growing demand for their patent cards.

The Athol Machine Company have chosen these directors: G. T. Johnson (president), Caleb T. Spear, A. Bangs, W. D. Smith, A. W. Goodman, S. H. Bellows, D. A. Newton (secretary and treasurer). The company are preparing to build their new brick foundry, which will be 90 x 45 feet, with an L 60 x 25 feet, and contain annealing, pickling, tumbling and grinding rooms.

At Uxbridge the committee chosen to look into the patent machine and screw of E. Wilder, of Boston, for which there has been some talk of building a shop here, report favorably, and \$75,000 has already been subscribed of the \$200,000 wanted to begin with. It is the intention if the project is successful to erect a large shop.

The new improved engine lathe made by Goddard, Shaw & Co., Brockton, has many new and valuable features worthy of the notice of machinists. It is a very heavy lathe, which with a 7-foot bed weighs 1800 pounds, and carrying 3-inch belt, and with 17-inch swing. The back gears are located under the head stock, and consequently out of the way in working the lathe, and with no danger of accidents to the operator. The advantage of this arrangement of the gears is that the lathe will turn a heavier chip without trembling than lathes with the back gear in the usual place. The lead screw is entirely covered up on the inside of the lathe bed, and is thus protected from chips and dirt, and the nut coming near the center of the carriage makes a more direct pull than in any other position. The tail stock is secured to the bed by the adjustment of a cam, which is simple and effective, and is easily set over by means of one screw.—Commercial Bulletin.

PENNSYLVANIA.

An accident occurred to the blowing engine at Monocacy Furnace some days ago which is quite serious, although it will not cause a blow-out. The piston broke, and as the engine made a revolution, it broke a piece out of the cylinder, and also cracked the cylinder head. The furnace will be kept running by the use of one engine until the repairs are made.

The Ward Axle, Brake and Coupling Company have taken formal possession of the property on Railroad street, in Monongahela City, lately purchased by the company. The company expect to turn out work by the middle of August.

Application is to be made to the Governor for the charter of an intended corporation, the Allentown Rolling Mills, the character and object whereof is the manufacture of iron and steel, or both, or of any other metal, or of any other article of commerce from metal or wood, or both. This is probably the company that will operate the mills of the late Allentown Rolling Mill Company.

Fairhance Furnace, Fayette County, is idle.

PITTSBURGH AND VICINITY.

The United States Iron and Tin Plate Co. has fallen into the hands of the sheriff. The reason for this was the foreclosing of two mortgages by the holder, Mr. J. H. Demmler, who is also president of the company. Mr. Demmler had lent the company money when financial embarrassment, caused by

the tariff duties on tin, had almost broken it up. The company never fully got on its feet after its first reverses, and of late has been unable to keep up to Mr. Demmler's terms, and the shut down occasioned by the strike has been disastrous to them. In this state of affairs Mr. Demmler deemed it best to foreclose. The company is a stock concern with \$75,000 worth of stock. It is expected that all of this will be lost. In addition to the \$110,000 due to Mr. Demmler, the company owes about \$40,000, almost all of which is for iron and other material furnished. Notes have been given for most of this debt, and they will be paid by the company when they mature. The assets are estimated as being worth from \$115,000 to \$125,000. It is more than probable that Mr. Demmler will buy in the property at Sheriff's sale. Since the first of June the works have been thoroughly repaired, and they are ready to start up full as soon as the strike ends.

Geo. Duncan & Sons are busy on the foundations of their new furnace. They are also doing repairs about the factory, and will set pots in the old furnace on August 1. This furnace has now been in continuous use for two years and is in first-class order every way. Their new set, No. 600, is just out, and is sure to meet with a favorable reception from the trade. The shape is novel, and it is embellished in rich and ornate designs. They will have another set (round) ready in a few days.

The repairs being about completed at W. D. Wood & Co.'s mill, McKeesport, work will be resumed with non-union men, as usual.

The Pittsburgh Smelting Co., established the first of April last, make a specialty of blast furnace and rolling mill work, house fronts, &c. They have met with good success, and now give employment to 40 hands. They are having a good run on hammer dies, ingot molds, and all kinds of anti-friction metal work. Mr. N. A. Didier, the manager, has had twenty years' practical experience in business in France, having come from there to this city one year ago. Mr. H. L. Shaffer, secretary and treasurer, is a native of this city. There are two buildings occupied, one 100 x 160, brick, two stories, and the other 80 x 150, two stories, brick. The Company are making large additions, to go extensively into the house-front business. Office and works, corner 13th and Pike streets.

Geo. A. Macbeth & Co. are running both their furnaces at present, their new one being in successful operation. The chimney trade has not opened up yet, but will be very brisk from present appearances.

WEST VIRGINIA.

Mr. J. F. Lewis, of Quinnimont Furnace, writes us, in correction of an item which recently appeared in these columns, to the effect that his furnace would soon blow out. He says that this is incorrect. The change they have lately made is that of shutting down on Sundays. The furnace is doing well.

OHIO.

A company has proposed to establish a glass tableware works at Massillon, which will at the start employ 125 hands, if the people of that city will donate to the company a site and \$6000 in cash. It is thought the proposition will be accepted.

The Morse Bridge Works, Youngstown, are running extra time on their contract with the Conneville extension of the Pittsburgh and Lake Erie.

The Akron Machine Works of Messrs. Taplin, Rice & Co., of Akron, manufacturers of steam engines, mill gearings and heating and cooking stoves, &c., which was established in 1861, and subsequently incorporated in 1871, have recently replaced two cupolas, put in a new blower, built an addition to their buildings and made several other improvements. The main works now occupy two lots, one 200 x 300 feet, the other 120 x 180 feet.

The Lane & Woodworth Glass Roofing Works, Youngstown, have closed down for the season, as is the custom of all glass works during the hot months of July and August. During the stoppage it is intended to reline the tank, repair the ovens, erect a packing house, and make a number of smaller repairs that have become necessary.

The Co-operative Glass Company, at Ravenna, which was dissolved some time ago, has been reorganized and the works will start up next week. Sixteen of the members retired, and William Haley, a foundryman of Ravenna, was taken into the firm. He put \$4000 into the business. Tony Snyder, one of the proprietors of the Acme Glass Factory in Steudenville, was also taken into the firm. He put in \$500.

The Phoenix Furnace of Brown, Bonnell & Co., near Youngstown, is being thoroughly repaired and put in shape for another five years' run. A new hearth is being constructed, and it is the intention to put a new hoisting engine in.

The Barney & Smith Mfg. Co., Dayton, are actively engaged in the construction of passenger and freight cars, from three to four months' orders from old contracts having yet to be filled. They have just received a new steam hammer and are employing 1200 men.

ILLINOIS.

A new corporation, called the McKinney Tubular Rail Company, has just been chartered, at Springfield, by David Carr Aldrich and other Chicago capitalists. The capital stock is \$1,000,000.

The Bergen Tool Company is the name of a lately organized concern at Batavia for the manufacture of all kinds of fine tools and machinery for special work. This company has recently purchased ground, erected substantial shops thereon, and equipped the same with new machinery and tools suitable for the prosecution of their business. H. M. Wade is president, Wm. H. Burnham, secretary and treasurer, W. D. Turner vice-president, and Wm. L. Bergen superintendent. Charles H. Besley, 175 Lake street, Chicago, is business manager.

The Elgin Electric Tower Company, with a capital of \$100,000, has for some time been engaged in manufacturing tubular iron towers for electric lighting. The Brush Company uses these exclusively.

The Elgin Watch Factory employs 1610 hands, ships 500 watches to Chicago every day; its pay roll is \$68,400 per month, and

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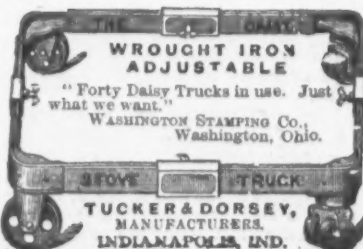
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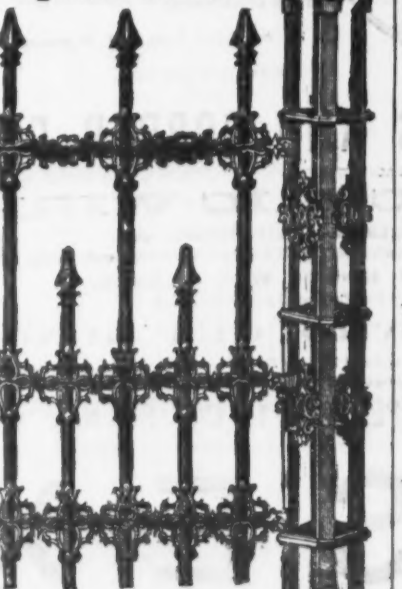
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the number of hands will shortly be increased to 2000.

Within the past four weeks the Thorn Wire Hedge Company, Chicago, have added to their establishment 15 more barb wire machines.

The Elgin Moseley Lathe Works employ 30 men manufacturing watchmakers' lathes and attachments. The output of these works has doubled during the last two years.

The Chicago Steam Boiler Works have recently increased their working force to 100 men, and have contracts on hand for building to boilers for firms in various portions of the country. The Schenberger Iron Foundry, in connection with the first named establishment, reports trade good.

The Illinois Iron and Bolt Company's factory, Carpentersville, manufactures thimbles, letter presses, and irons and blacksmiths' tools. It annually consumes from 8000 to 9000 tons of iron, employs 160 hands, whose wages amount to \$90,000 a year, and their products aggregate \$350,000.

The Chicago Die and Machine Works have just finished for use a number of improved car-wheel grinding machines, which, in their construction, differ from those already in use. The establishment is also building several barb wire machines of a new pattern, and reports trade good.

The engines and boilers for the Northwestern Horse Nail Co.'s Works at Brighton are ready to place, but the building is progressing slowly on account of the scarcity of brick. This company have erected a temporary machine shop on the grounds, and are building 25 forging and about 20 finishing machines to be used in the works. The building will probably go rapidly forward to completion after this week, as the contractors have agreed to deliver eight carloads of brick per day.

The Gates and Scoville Iron Works, Chicago, will hereafter be known as the Gates Iron Works.

MISSOURI.

On account of having to make room for the erection of their new machinery, including an engine, the Missouri Wire Fence Company, St. Louis, are running only about half of their works.

The South St. Louis Iron Works have put in a new lathe and a screw cutter, and will, in a few days, put in a new planer and a 6 x 12 engine.

The Standard Tool Company, St. Louis, who shut down their works on the 28th of June to make necessary repairs, will start them up in a few days.

MICHIGAN.

The following table exhibits, in gross tons, the total lake shipments of iron ore from upper peninsula ports the present season, up to and including July 19, together with the amount shipped during a corresponding period last year:

Name of port.	1881.	1882.
Escanaba	550,511	705,720
Marquette	25,136	448,978
L'Anse	19,500	21,919
St. Ignace	1,000	24,775
Total	615,147	1,276,135

Showing an increase of 461,138 tons.—*Marquette Mining Journal.*

The Center of Population.

A volume recently issued from the Census Office, embracing a portion of the statistics gathered at the enumeration of 1880, contains among many valuable maps illustrating the distribution, density and character of population, a diagram which shows how the center of population has shifted from decade to decade since 1790, in its steady march westward. What statisticians understand by the term center of population, it may be well to explain, is the point at which equilibrium would be reached were the country taken as a plane surface without weight, and the inhabitants distributed over it in number and position as they are found at the period under consideration, each inhabitant being supposed to be of equal weight, and consequently to exert pressure on the pivotal point in direct proportion to his distance therefrom. The first census of the United States, taken in 1790, showed the center of population to be on the eastern shore of Maryland, about 22 miles from Baltimore, and near the 39th parallel of latitude. From that point it has moved westward at the average rate of about 51 miles in a decade, never deviating as much as a degree to the north or south of the 39th parallel. By 1800 it was moved 41 miles, and was found at a point 18 miles west of Baltimore. In 1810 it was near the Potomac in Virginia, at a place 40 miles northwest of Washington, having traveled 36 miles during the preceding decade. Its progress in the following 10 years was 50 miles, and in 1820 it was in the valley of Virginia, 16 miles north of Woodstock.

The census of 1830 discovered that the center of population, previously a little north of the 39th parallel, had passed that line and was a trifle to the south of it, at a point in the Allegheny Mountains 19 miles west of Moorfield, Va. The progress westward since 1820 being 39 miles. This was the most decided southward movement it has made in any decade, and is explained by the acquisition of Florida and the settlement of Alabama, Mississippi, Louisiana and Arkansas. In the ensuing decade the center recrossed the 39th parallel, moved 55 miles westward, and was found at a point 16 miles south of Carlsburg, Va. Southern Michigan and Wisconsin and Northern Indiana and Illinois had begun to fill up, and their population turned the balance to the northward. In 1850 it was still in Virginia, but close to the Ohio River, having moved 55 miles, and being at a point 23 miles southeast of Parkersburg. Again it was south of the 39th parallel, but only a distance of about a mile, the deflection being explained by the annexation of Texas. By 1860 it had reached a point 20 miles south of Chillicothe, Ohio, and a little north of the 39th parallel, having made the greatest progress ever made in a decade, the distance from the last point being 81 miles. This remarkable movement was caused by the settlement of the Pacific coast—12 persons in San Francisco, by reason of their distance from the pivotal point, counterbalancing 40 persons in Dayton. The next

step was 42 miles westward and about 12 northward, which brought the center into Highland County, Ohio, about 43 miles east by north of Cincinnati. It is believed that the apparent northern movement during this decade was caused by a defective enumeration of the colored population of the Southern States at the census of 1870. In 1880 the center was near the village of Taylorsville, Ky., about 8 miles west by south of Cincinnati, the westward progress being 58 miles and the deflection to the south about 8. The census of 1890 will probably discover it in Jennings County, in Southeastern Indiana.

If there is no great change in the rate of Western movement of population, the central point, still traveling, as it doubtless will, on a line closely corresponding to the 39th parallel of latitude, will not cross the Mississippi River until 1950, when it will be found not far from the mouth of the Missouri. It is not improbable, however, that it will never reach that stream, but will remain nearly stationary somewhere in Southern Illinois. There are large areas of country in the far West unfit for habitation, save where deposits of the precious metals are found, and other considerable areas where grazing, which supports but a scanty population, will always be the chief industry. The increase of population in the trans-Mississippi region may not, therefore, much more than counterbalance the increase in the older-settled portion of the country after the close of the present century. In estimating the changes and progress of the future, we must not forget that, marvelous as is the growth of the new West, it is only a little more rapid than that of the great middle region between the Hudson and the Mississippi. The State of New York, it must be remembered, added 700,000 to her population between 1870 and 1880, Pennsylvania 460,000, and Ohio 532,000. The increase in each of these old States would make a Western State as populous as Nebraska.

Coal and Coke in Pittsburgh.

The bituminous coal field of Pennsylvania, which underlies a large portion of the State from which the manufacturing establishments of Pittsburgh draw their vast supplies, is estimated to contain about 14,000 square miles. The mere matter of area, however, can not be considered as a measure of the value of a coal deposit, its essential elements being quality, thickness, regularity of its accessible veins and cheapness and facilities of transportation to market. During the census year ending with June 30th, 1880, the quantity of coal produced in the United States amounted to 42,417,764 tons, of which the three counties of Westmoreland, Allegheny and Fayette, which are largely dominated by Pittsburgh's capital and energy, produced the following amounts:

Allegheny	4,495,871
Westmoreland	3,227,320
Fayette	2,310,798
Total tons	10,033,989

The above figures represent 25 per cent. of the entire quantity turned out, and about 1,300,000 tons were shipped by rail almost exclusively for use in the manufacture of illuminating gas, and 1,000,000 tons were consumed in Pittsburgh for gas manufacturing and domestic purposes. In this connection the following figures are given:

Capital invested	\$15,500,000
Hands employed	17,000
Value of product	\$1,200,000
Amount of product (tons)	7,700,776

At the very gates of Pittsburgh and tributary to its commerce are located the interesting and highly productive coke-making regions of Western Pennsylvania. This district, like the oil regions, cannot be duplicated in the world. The sole product of this area is coke, a commercial fuel which is greatly sought by iron foundries and smelters from Lake Champlain and New York on the East to the Salt Lake and Omaha on the West, and from Canada to the Gulf of Mexico. Coke is the product of slow combustion applied to the chief mineral of this region. The coal is a well-defined portion of the Pittsburgh coal basin, the vein varying in thickness from 8 to 11 feet, and worked at all depths below the surface down to 300 feet. The entire deposit of coal lies to the southeast of Pittsburgh, and varies in width from 2 to 12 miles, with a length of 40 miles, the northern end of the basin or deposit being near the town of Latrobe, and its southwestern limit extending into the State of West Virginia. The extent and character of the industry may be readily imagined by an inspection of the annexed figures:

Capital invested	\$10,854,000
Hands employed	6,500
Value of product	\$4,423,519
Amount of product (tons)	2,700,037

Ready-Made Houses.

At different times we have had occasion to answer inquiries from correspondents with regard to ready-made buildings. Accordingly we take pleasure in directing their attention to a catalogue of house plans, with details and descriptions, adapted to temperate and tropical climates, recently issued by the New York and Flushing Building Co. The illustrations in this book represent buildings constructed by this company for local and export markets. The post office address of the company is Flushing, N. Y. Portable houses made by this company are constructed under patents controlled by it, and are first erected at the factory, each piece being marked in position, so as to identify it when the building is put up at its destination. A drawing representing the building is similarly marked, by which means unskilled labor is able to put up the buildings wherever required. The catalogue embraces houses ranging in size from a single room 9 by 12 feet, to houses two stories high, with 9 and 10 rooms, halls, &c. Houses of a single story, with veranda on all sides covered by the main roof, containing 10 rooms, are also made. Besides dwelling houses, various outbuildings are also made by this company on the same general plan. Churches are also prepared. This catalogue is calculated to meet the wants of all who are interested in the subject of portable houses, and it answers many questions which continually arise with reference to a subject of this kind. In addition to the designs already referred to a

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"DOUBLE-LIFT" HOISTING GEAR,

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CAPACITIES, 500 TO 2000 LBS.

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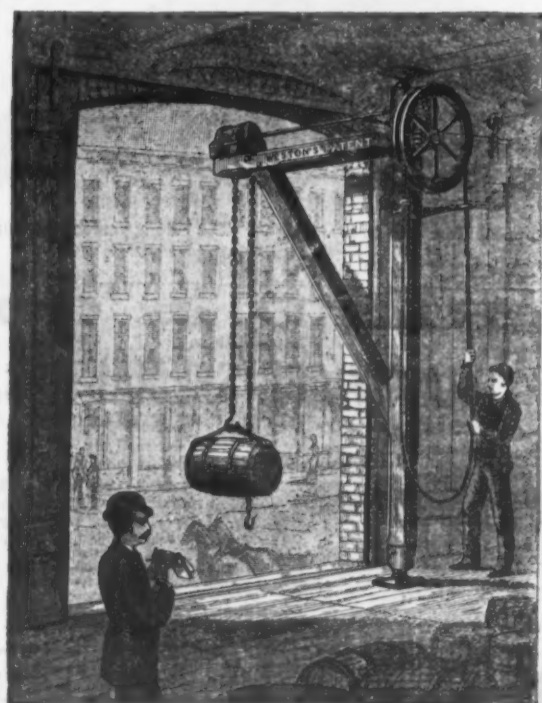
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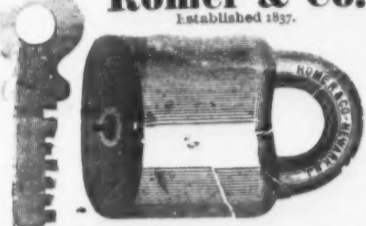
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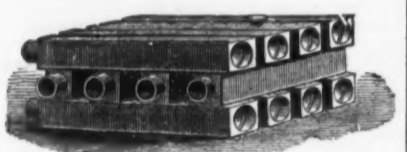
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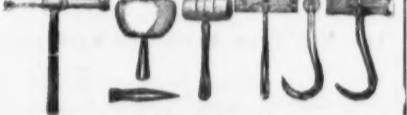
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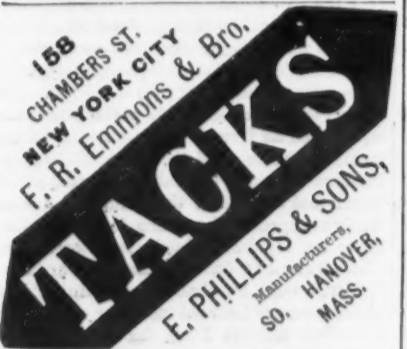
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Gaskets and Rings,



Vacuum Pump Valves,
Ball Valves,
Car Springs,
Wagon Springs,
Gas Tubing,
Machine Belting,
Billiard Cushions,
Emery Wheels.

This company manufactured the immense DRIVING and ELEVATOR BELTS for the Buckingham
Elevators at Chicago, which have been running perfectly for more than twelve years, also those for
Armstrong & Co. of Chicago, Vanderbilt's Elevators for the N. Y. Central & Hudson River R. R., the
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lyn, and many others; in fact, the largest Belts for the largest Elevators in the world.
A single carrier belt in the Penna. R. R. Elevator is over 200 feet long, weighing 18,000 pounds, and
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Emery Wheels and Packing.



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Solid Vulcanite EMERY WHEELS

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LARGE WHEELS MADE ON CAST-IRON CENTER IF DESIRED.

The properties of these Wheels are such that they can be used with great advantage and economy
for cutting grinding, and finishing Wrought and Cast Iron, Chilled Iron, Hardened Steel, State, Marble
Glass, etc. These wheels are extensively used by manufacturers of Hardware, Cutlery, Edge Tools,
Pumps, Saws, Stoves, Fire Arms, Wagon Springs, Axles, Skates, Agricultural Implements, and small
Machinery of almost every description.

Pat. Jan. 26, 1866.

PATENT ELASTIC

Rubber Back Square Packing

BEST IN THE WORLD.

For Packing the Piston Rods & Valve Stems of Steam Engines & Pumps.

B represents that part of the packing which, when in use, is in contact with the Piston rod.
A the elastic back, which keeps the part B against the rod with sufficient pressure to be steam tight,
and yet creates but little friction.
This Packing is made in lengths of about 20 feet, and of all sizes from 1/4 to 2 inches square.

Corrugated Rubber Mats and Matting,

Pat. 11,308, 213,501

For Halls, Flooring, Stone and

Iron Stairways, &c.



This practical and indispensable article—
especially for wear where exposed to
ice, snow or slush—was first intro-
duced by this company several years
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almost indestructible, when
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its manufacture, whilst the cheap,
inferior quality forced on the public by reckless imitators of our patent goods soon becomes brittle
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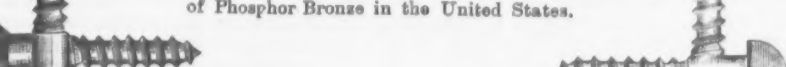
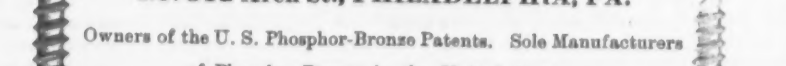
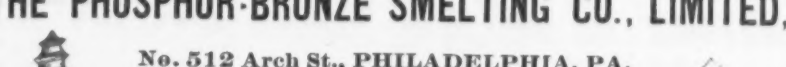
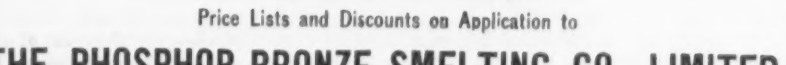
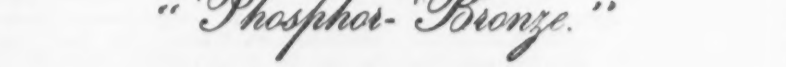
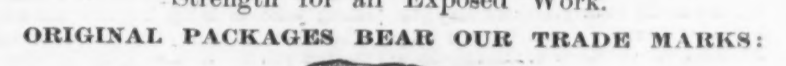
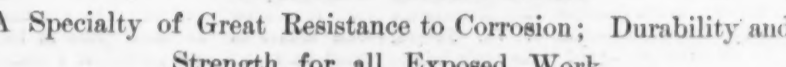
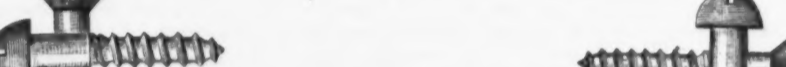
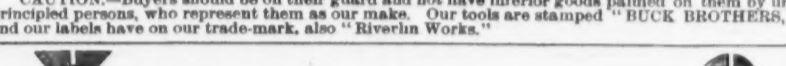
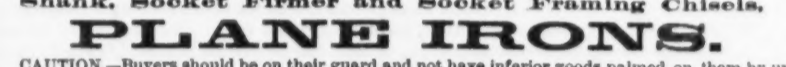
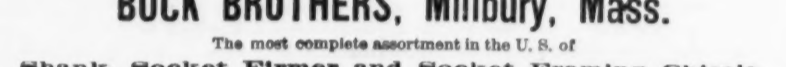
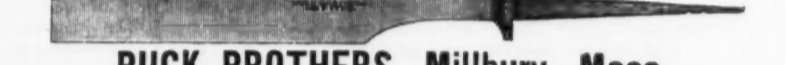
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and our labels have on our trade-mark, also "Riverline Works."



number of perspective views of modern
houses of moderate price are also given, to-
gether with a number of plates of moldings,
sash, doors, blinds, balusters, newels, &c.

What the French are Doing in Practical Education.

One of the English commissioners has the
following in regard to what the French are
doing in the way of practical technical edu-
cation: French elementary schools are all
free; dinners are supplied to the schol-
ars at half cost, and in many cases free;
they have lessons in drawing from models
and casts, and, beginning at six and seven
years of age, they are taught the use of
tools. Attached to the schools are little
workshops, provided with lathes, &c., where
the boys make boxes, turn file handles, and
undertake all kinds of jobs. "You would,"
says this commissioner, "be positively
amazed to see some of the ironwork, both
with forge and file, done by boys of 13
and 14. There is one school—free, like
the rest, to those who can pass the entrance
examination—where, in addition to a high-
class commercial and scientific education, the
boys work at the bench or lathe for 5 or
6 hours a day, and they execute work of a
high-class kind in the shape of tools (for other
schools), small steam engines, locks, tele-
graphic instruments, and woodwork of
various kinds. When the students leave
school at 16 or 17, they are able almost
invariably to take situations equal to those
of young men who have gone through a
regular course of apprenticeship." In
some of these institutions the pupils' hours
are very long. Their hours of
work and study are 13 per day, and the
older students spend 7 hours each day in the
workshop. While at their studies they are
taught mechanical drawing, political econ-
omy, &c. "We saw," says the writer,
"the boys change from the classroom to the
workshop. In a few moments the handsome
uniform was changed for the traditional blue
blosse of the French workman, a smart
young fellow started the engine, and lathes,
planing machines, drills, and the usual appli-
ances of a modern shop were set in motion.
Under first-class mechanics specially trained
to unite theory with practice, 150 students
were collected in one large room, with ample
accommodation for all their operations, and
doing the rough and smooth work, and all
the delicate manipulations of a first-class es-
tablishment. I counted 44 lathes of various
kinds, and over 70 fitting and filing benches
in this one room. In the blacksmith's shop
I counted over 40 young fellows at
work, some engaged in making small tools,
others stripped, like the sons of Vulcan, for-
ging shafts and keys, and swinging the heavy
sledge with the measured beat of the village
blacksmith of old. In the foundry there
were 30 young fellows engaged in pattern
molding, and one of the castings made by the
students a day or two before was said to
weigh one and a half tons. The great ma-
jority of the boys are the sons of workmen,
and they are taught and boarded at the
school mainly at the public expense." Three
years in these technical schools constitute a
course of training, and one of the directors
asserts that his pupils hold the leading situa-
tions in the large manufacturing establish-
ments in France. This system of technical
education is, no doubt, a costly one, but the
French taxpayer does not grumble. He recog-
nizes the importance of educating the arti-
san and of developing the resources of the
country, and this, he thinks, can be done to
a great extent through the technical schools.

METALLURGICAL NOTES.

A NEW ORE ROASTING FURNACE.

A new form of furnace composed of three
revolving cylinders of different diameters
and lengths, longitudinally connected and
communicating with each other, having a
fire-box at each end and suitable dust cham-
bers, and provided with novel internal stir-
ring or pulverizing devices, with internal air
supply pipes, and with external automatically
operating salt box and ore discharge pipe, is
being introduced in England. One of the
cylinders is designed to be about 12 feet long,
having an external diameter of 4 feet, and is
constructed in flanged sections bolted to-
gether. The shortest cylinder is about 2
feet long with an external diameter of 6 feet,
and is bolted through its flanged end to the
flanged end of the longer cylinder. The
third cylinder, being 4 feet long and about
30 inches in external diameter, is bolted by
its flanged end to the opposite flanged end of
the short cylinder. The furnace is provided
with suitable encircling rings or tires, bear-
ing anti-friction rolls, whose shafts are sup-
ported by frames, the rolls nearest the
ends of the furnace having flanges to pre-
vent longitudinal movement of the furnace.
Encircling the short cylinder is a toothed
gear, meshing with a small cog wheel on the
driving shaft. The furnace is designed to
have an inclination of about one inch in 6
feet, inclining downward from the smaller
to the larger end. The longer cylinder is
longitudinally corrugated, forming a series
of parallel and alternate depressions and
projections on the inside. Along these pro-
jections are bolted angle irons, extending
from one end to the other of the cylinder,
and forming, in combination with the de-
pressions, a series of buckets for lifting or
stirring the ore as it passes through the fur-
nace, the buckets lifting the ore and letting
it fall through the flame or hot air passing
through the furnace, and exposing it at the
same time to the air admitted through the
air pipes that will presently be described.
The depressions are designed to be about 4
inches deep. The cylinder of greatest diam-
eter is also longitudinally corrugated in the
same manner as the long cylinder, and has
angle irons secured along its inward pro-
jections, and extending partly over the de-
pressions, forming buckets similar to those above
mentioned. Fire brick or angle irons are
used to project the falling ore into the body
of the furnace, also covering the space be-
tween the buckets and protecting the shell
of the furnace from the action of heat. In
the case of the cylinder of greatest diameter
the corrugations terminate a short distance

from the head, thereby leaving the cylinder
at that point of the diameter of the outside
of the buckets, forming a gathering trough
for the ore. To an opening in this trough is at-
tached a discharge pipe provided with a valve.
As the ore is fed into the furnace it falls to
the bottom, is caught in buckets, and is
carried up. After passing the central line
of the cylinder it begins to fall in thin sheets
and continues to fall regularly until each
bucket in turn becomes emptied. In falling
the ore passes through the air and heat in-
troduced into the long cylinder, and strikes
upon the bottom of the cylinder a little in
advance of its starting point, depending upon
the inclination. The ore is then again car-
ried up and falls, and this process is con-
tinued until it falls into the shortest cylinder.
In its progress through the long cylinder it
becomes gradually heated, and the sulphur
and other volatile or inflammable substances
contained in it are either burned or volatil-
ized and the ore oxidized. Near the end of
the long cylinder the ore is met by an in-
creased temperature from the shortest cylin-
der and fire flue, by which the sulphates still
remaining in the ore are decomposed. The
salt or other chemicals introduced here unite
in regulated quantities with the ore at each
revolution of the furnace, and together they
pass into the shortest cylinder, and are there
thoroughly mixed and ground, and any ag-
glutinated lumps of ore are thereby pulver-
ized, and any remaining excess of sulphur or
other volatile substance escapes. The ore
finally passes through the side orifices into
the buckets of the last cylinder, where it is
exposed to the action of either chlorine gas
or air, and is afterward gathered in the
trough, previously referred to, whence it es-
capes through the discharge pipe.

MALLEABLE BRONZE.

It is claimed that the addition of from 1
to 2 per cent. of mercury to bronze renders
the latter as malleable as copper or iron.
The mercury may be combined with one of
the metals of which bronze is made, previous
to the mixture of the several constituents.
It may be added to the metal when in a
molten state, agitation being designed to in-
sure a thorough mixture, or it may be put
into the melted copper along with the tin or
just after the latter has been added, or an
amalgam of tin may be stirred into the
melted copper.

EFFECTS OF COMPRESSION ON THE HARDNESS OF STEEL.

Mr. Lau reports that at the works of Saint
Jacques, at Montluçon, France, the method
of compressing cast steel has been applied on
a large scale for the last six months. The
process consists of submitting the molten
metal to the action of a hydraulic press
which can exert a pressure of from about
15,000 to 22,000 pounds per square inch, the
pressure being kept up until the ingot has
solidified and cooled. The result of this
method is similar to that obtained by M.
Clémendot's process, a brief account of
which was given a short time since. It is
said that numerous analysis, made with a
view of ascertaining the quantity of carbon,
have shown that the quantity of combined
carbon in proportion to the total quantity of
carbon is greater in the compressed than in
the ordinary steel.

EXTRACTION OF NICKEL.

According to Messrs. W. E. C. Eustis and
H. M. Howe, Thomson's process for the ex-
traction of nickel consists essentially in first
rendering the nickel magnetic, and then
separating it from the materials with which
it is mechanically mixed by means of a mag-
netic separator. In the case of oxidized
compounds of nickel it would generally be
desirable to bring the nickel to the metallic
condition in which it is most highly mag-
netic. The compounds of nickel with sul-
phur would probably, in the greater number
of cases, be most readily separated by bring-
ing the nickel approximately into the state
of sub sulphide, in which condition it is also
magnetic. In most cases where nickel occurs
with a considerable proportion of the heavy
metals, it would be best to effect the magnetic
separation before fusing the material, since
on fusion the nickel would enter into a
chemical combination with the other metals
present, as an alloy, matte, speise, or similar
compound, from which, of course, the mag-
net could not separate it. For cases where
nickel occurs with a large proportion of iron,
the following plan has been proposed: The
either naturally or artificially oxidized com-
pound of nickel is treated with a mixture of
carbonic oxide and carbonic acid, or of other
reducing and oxidizing gases, in such pro-
portions that they are capable of reducing
nickel so nearly to the metallic state as to render
it magnetic, but still containing so much
carbonic acid or other oxidizing gas as to be
unable to reduce iron to that condition. It
cannot be positively stated that it is possible
in this way to render nickel magnetic with-
out at the same time rendering iron mag-
netic; but experiments made by the writers
render it probable that this can be effected.
Having rendered the nickel magnetic, it can
then be separated with the magnet from all
matter with which it is mechanically mixed.

A Remarkable Railroad Accident.

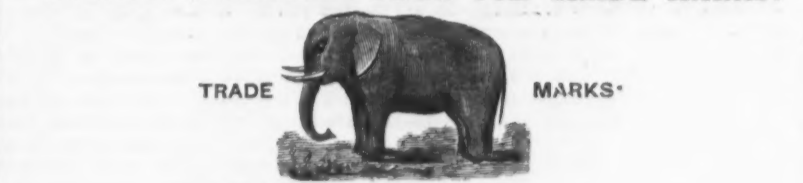
The author of the following account of a
singular railroad accident is not known,
which is to be regretted: "In a very
mountainous eastern State, in a very pictur-
esque region, a line of railroad was in op-
eration. It was built at one point upon the
opposite sides of two mountains, with, of
course, a valley between. A locomotive
was stationed at the summit of each to pull up
the trains. In one instance, when a long
passenger train had reached within a short
distance from the top, the heavy wire cable
broke and away it went more rapidly than
the imagination of the narrator, to the valley
and up the other mountain, a half mile, like
a flash, and the presence of mind of a pas-
senger, a book agent by the way, ar-
rested it from running down the other side
as he checked it by the brakes. Anyhow,
back went the train to the bottom, and again
ascended the other side, thus see-sawing for
the greater part of the day before the power
of gravity overcame the momentum. The
ladies shrieked, but speed was such that the
train left the sound behind, and the prayers
that were uttered on the crest of one moun-
tain were met by the returning train in the
valley."



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The Iron Age

Metallurgical Review.

New York, Thursday, July 27, 1882.

DAVID WILLIAMS, Publisher and Proprietor.
JAMES C. BAYLES, Editor.
JOHN S. KING, Business Manager.

RATES OF SUBSCRIPTION, INCLUDING POSTAGE.

THE UNITED STATES, BRITISH AMERICA AND SANDWICH ISLANDS.
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RATES OF ADVERTISING.
One square 12 lines, one inch, one insertion, \$2.50; one month, \$7.50; three months, \$20.00; six months, \$35.00; one year, \$60.00; payable in advance.

BRITISH AGENCY.
Office of THE IRON AGE, 443 Cannon St., London.

DAVID WILLIAMS, Publisher,
83 Beale Street, New York.

PITTSBURGH: 77 Fourth Avenue, Jos. B. Weiss, Manager and Associate Editor.

PHILADELPHIA: 220 South Fourth Street, Thos. Hobson, Manager.

CHICAGO: 35 & 38 Clark St., Oct. Lake, Henry Smith, Manager.

CINCINNATI: T. T. Moore, Builders' Exchange, Manager.

CHATTANOOGA: Eighth and Market Streets, S. B. Lowe, Manager.

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Subscription, postpaid, \$5.00 per annum in advance.

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The Labor Situation West.

There has been but little change in the strike at the iron mills West since our last report, and it is doubtful if there will be any material change until after the meeting of the National Lodge of the Amalgamated Association, which convenes in Chicago August 1st. Both sides seem waiting for this meeting; the workmen to see from its actions what is the opinion of the association at large as to the strike, and from this to judge what their course shall be. It is already an open secret that at this convention a decided effort will be made, by no inconsiderable number of the delegates, to adopt some measures that will lead to an ending of the strike. As we have so often stated, there is no question of the fact that a large number of the members of the association believe that the strike was premature and unwise, and this element will make itself felt. Certain action that the Association may take will reveal to outsiders at once how strong and influential this element is, and will give some indications as to the probable course of the association. It is stated that a meeting of prominent members of the association was held at Pittsburgh last week, at which this point of a settlement was discussed. None of those present would give the slightest clew to what had been done, the uniform reply being that matters had been considered in which the public had no interest. It was stated by outsiders, who professed to know, however, that it had been decided to urge, at the meeting of the National Convention in Chicago next month, that measures be taken to reconcile the differences between the manufacturers and workmen. How true this report is we do not know, but there is no doubt of the fact that this convention at Chicago will have an important influence on the strike, either one way or the other.

On the other hand, the manufacturers are waiting for this convention in order to determine from the result of its action what their future course shall be. Up to the present their course has been a passive one. The state of trade has been such that they have been content to let matters drift along, making no effort to put their mills in operation. Should the present dullness continue they will feel no inclination to change their course of action, and should the outcome of the convention at Chicago be such as to lead them to suppose that the opinions of those who have not been favorable to the strike have prevailed, then there will doubtless be a continuance, for a little at least, of the present policy of inaction; but should the outcome be such as to indicate a long continuance of the struggle for an advance, then it will be for the manufacturers to decide what course they will pursue. It surely cannot be supposed, even by the most sanguine members of the Amalgamated Association, that this policy of inaction will be continued indefinitely. They know that already there are some manufacturers who do not regard the Amalgamated Association in the same favorable light that the majority do, and they know that these manufacturers have tried to convince the others that the union has not been so beneficial as has been believed, and a long continuance of the strike may be an effective argument that may lead to a change in this policy of inaction.

Just what the policy of the convention will be it is of course impossible to tell. We repeat that very many of the better men in the association believed the strike was unwise and ill-timed. They believed that the condition of trade would not help them, and knew that the condition of the treasury of the Amalgamated was not such as to stand a long strike. Those who argued that the manufacturers would give in in two weeks or four at the most, and that the demand upon the treasury would not be great, have found out their mistake. It is now beginning the eighth week of the strike, and there are no signs of surrender on the part of the manufacturers of Pittsburgh, Wheeling, the valleys and Cleveland. Five weeks' strike pay, or \$30 a man, is now due and how much has been paid? Even the desperate efforts to get the mills west of Pittsburgh and the other points named above to work in order to bring in revenue, while they have succeeded, have not relieved the treasury much and the feeling of discontent is growing on the part of those districts that have paid large sums of money for years past into the treasury, and now in their need do not get back. This feeling will make itself felt at the convention. The demand of the financers for equal representation with the puddlers will also be an important element in the convention. The whole truth about the convention of July 3, at Pittsburgh, has not been told in public, but if the views of that convention are carried out, its effect on the strike will be very important.

As regards the present situation, the only important development of recent occurrence has been the acknowledgement by the workmen that the backbone of the strike in Cleveland has been broken by the success of the Cleveland Rolling Mill Co. in its endeavor to run non-union. It is stated that on Saturday a committee of six members of the Amalgamated Association called upon President Chisholm, at the company's office, to say that the men had been deceived into going into the strike and desired to return to work. Mr. Chisholm declined to receive them as a committee, in accordance with his well-known policy not to recognize the union in any manner. The capitalists were told

if they wished employment they should apply at the mills, where they would be talked with as individuals. They went to the mills with the same request, and after a consultation with the superintendent left, saying they would ask President Jarrett to declare the strike off.

President Jarrett, of the Amalgamated Association has been interviewed by one of the Pittsburgh daily papers, and he stated that it was the first intimation he had received that any action such as reported had been taken, but, after a pause, said he had reason to believe that the report was not without foundation. Sixteen of the strikers became discouraged last week and returned to work in the converting department of the mill, and since that time he had been almost satisfied that it would be useless to continue the struggle longer. He supposed a committee would call upon him to day, and if they did so he would advise them to return to work at the company's terms, as he considers it wrong to ask men to continue a struggle against their own judgment, and in which the extent of their loss will be measured by the length of time they are idle. The chief reason for giving up the ship, he said, was because under the rules benefits were paid only to persons who had been members of the association six months. The Cleveland men had not been in the association that long, and received no assistance, and many were compelled to return to work in order to supply their families with the necessities of life.

When asked whether, under the terms of the Rolling Mill Company, the strikers would be compelled to abandon their organization, Mr. Jarrett replied, in a cheerful manner, that that matter would be "got over" in a very short time. What means were to be used he did not say. The effect of the failure at Cleveland, while beyond doubt discouraging in a sense, he did not appear to think would make any change elsewhere. The organization had been but recently established at Cleveland, and the fact that the men of that place were not firmly rooted and grounded in the faith, he explained, accounted for their admitting themselves to be beaten in what in other localities had come to be regarded a short time. In other sections and in Pittsburgh, especially, he contended, the fact that one firm at great expense had won a victory would not be felt. Notwithstanding Mr. Jarrett's cheerful view of the matter, the fact remains that the Amalgamated Association have been beaten in the city where a few days ago they claimed that the strike was not broken, that it was as strong as ever, and that it would certainly end in victory for their side. To come from such assertions as the last to a statement such as Mr. Jarrett is said to have made in the foregoing interview, looks very much like an "advance backward."

In an interview in the Pittsburgh Post of Friday, President Jarrett is made to say that 30,000 men are at present idle in the mills because of the strike, of which 16,000 belong to the union. He also states that there are 13,000 members belonging to the union at work in the West and over 10,000 in the East. This would make 39,000 members. As it has been claimed that the membership of the association was between 65,000 and 70,000, where is the other 25,000 or 30,000? In answer to the question as to how many mills are at work now which have signed the scale, Mr. Jarrett said 16—The Whitaker Iron Company, Wheeling; Carnegie Bros., Pittsburgh; Kirkpatrick & Co., Leechburg; Singer, Nimick & Co., Hussey, Howe & Co., Pittsburgh; C. Westlake & Co., Warren, Ohio; Akron Iron Company, Akron, Ohio; Sharp & Daniels, Steubenville, Ohio; J. L. Edwards & Co., Canal Dover, Ohio; Forest City Iron Works, and Union Rolling Mill Company, Cleveland; James Ward, L. B. Ward, Niles, Ohio; Ohio Falls Iron Works, New Albany, Ind.; North Chicago Rolling Mill Company, Bay View; Dilworth, Porter & Co., Pittsburgh; Lawrence Rolling Mill, and "Old Mill," (the latter run by the N. Y. and O. Iron and Steel Co.), Ironton, Ohio; Calumet Iron and Steel Company, South Chicago, Ill.; Moundsville Rolling Mill, Moundsville, W. Va. Several of these have not signed "the scale," if by his is meant the scale presented May 31st. These have signed "a scale," but not the scale of May 31st. However this may be, at least six of these sixteen are reported as denying that they have signed any scale; verbal and written agreements have been made, but no scale has been signed.

As an offset to this there are, counting steel mills—and, as Mr. Jarrett's list includes steel mills, this is fair—at least 13 mills running that have signed no scale nor entered into any agreement with the Amalgamated. Among these are Everson, McCrum & Co., Scottdale; W. D. Wood & Co., McKeesport; Laufman & Co., Apollo; Park, Bro. & Co., Pittsburgh; Miller, Metcalf & Co., Pittsburgh; A. Klonan, Pittsburgh; Lake Erie Iron Company, Cleveland; Cleveland Rolling Mill Company, Cleveland; Ohio Iron Company, Zanesville; Wellsville Plate and Sheet Iron Company, Wellsville, Ohio; McDonald & Bro., St. Louis; and two other concerns that it is not best to name. Add to these the very much larger number that have not signed and are idle, and the fact remains that at the beginning of the eighth week in no previous struggle has the condition been so favorable to the manufacturers. There never was a time at this date in the struggle when so many mills were running non-union, when so many mills were

idle, when so few were running. One feature in connection with this struggle has been the failure of the United States Iron and Tin Plate Company. Though this company was embarrassed, it is claimed that they could have got through had it not been for the strike. This was one of the class of mills upon which the demands of the association bear most heavily.

Sliding Scales in English Iron Works.

For many years the wages paid the ironworkers in the North of England have, for the most part, been based on sliding scales. The Board of Arbitration in existence in that district was organized in 1869, and in 1871 the first sliding scale was adopted, the basis and terms of the scale being arranged in connection with the board. The arbitration which has just been held at Middlesborough (April 12 and 13), with Mr. J. W. Pease, M. P., as arbitrator, has brought out the history of these scales. This, with other information in our possession, enables us to give a full account of the working of these scales, and to make a comparison between the English scales and those in effect in this country.

First, as to the basis of these scales. An examination of them shows that the rule that has prevailed for many years in England of paying for puddling on the basis of a little more than one shilling for each £ selling price, has been adopted as a basis. These scales show that the extra above a shilling to the £ varies from 9/ to 1/6. It is difficult to express this by percentages, but it will average, say, 6 1/2 per cent. of the realized price for iron. A second feature of these scales is that there is no limit. The wages for puddling decline with the fall of the price of iron. A third feature of the English scale is that it is based on the average realized selling price for iron. This is arrived at by taking from the books of the firms the latest weight of all classes of manufactured iron sold, and the total amount received for such iron, from which is deducted the amount of freight included in invoices, the discounts on payments and the commissions paid, if any. From this is also deducted all allowances or losses for defective quality. In a word, the prices on which wages are based are the net cash prices at the works, less commission to agents. After all these deductions are made, the remainder is divided by the amount of iron sold, and the quotient is the average realized selling price per ton. A fourth feature of these scales is that the realized selling price of each quarter is taken as the basis of the wages for the next quarter.

Now, taking up these different features and comparing them with the sliding scales in force at Pittsburgh, in the first place the percentage between the price of puddling and selling price of the iron is very much greater in this country than in England. The iron sells for more, which at the same percentage rate would give more wages, but in addition the percentage is also greater. It is impossible to arrive at the rate in this country, but it will be from 8 to 10 per cent. of the nominal card rate on bar iron. The puddler, for example, in this country is paid \$5.50 at Pittsburgh to-day on a 2 1/2¢ card, or \$56 a ton, while in England he is paid 8/ on a realized net price of £6. 3/4, or at \$8.44 to the £—\$1.93.4 for puddling on an average selling price of \$29.76. So it will be seen that not only does the puddler get an increased wage proportionate to the increased price, but his proportionate rate to selling price is increased. In the second place, the American puddler has a great advantage over his English fellow by having a limit to his scale. The English price for puddling follows the selling price of iron, no matter how low. At Pittsburgh, no matter how much below \$56 a ton iron goes, the puddler is paid \$5.50. So that when iron sells at \$7.60, or \$35.84 per ton, as it did at one time, he gets \$5.50, or over 15 per cent. of the selling price of bar iron. We believe that such a limit to a scale is desirable and just—whether 2 1/2¢ card is such a limit is another question. The Pittsburgh scale differs in the third place in being based on a card rate instead of a realized selling price, as is the English. Here it is difficult to make a comparison between the two scales. At first sight, in view of the extras on the American price list, it would seem that the American puddler was at a relative disadvantage with his English fellow, whose wages are based on the average price of all grades of iron. This, on examination, will be seen not to be so. The average selling price of all classes of English iron is lower than the selling price of bars. For example, for the three months ending March 31, 1882, the average price of bars was £6. 8. 2.80, while the average selling price of all classes, except rails, was £6. 3/0.94, or 5/ less. So that the fixing of the basis of puddling on all grades of iron instead of on bars, is really to reduce the English puddler's wages.

The English puddler is also at a disadvantage in having his price based on the net cash returns, or price received for the iron. The American puddler's wages are based on the nominal card rate, which is, almost without exception, higher than the realized rate—generally 10 to 15 per cent., and often 20 to 30 per cent. If the realized selling price were taken, it would be very much to the advantage of the manufacturer. The English puddler is further at a disadvantage in having to take the selling price of one quar-

ter for the wages of the next. It is too slow. To be sure, it works both ways. If it is slow in going up, it is slow in coming down; but such slowness, especially on a rising market, is apt to breed discontent, as it has done in England. In this country the card rate, as fixed by the Western Iron Association, is taken. This is of great advantage. The card is almost always advanced as soon as the market will justify, but manufacturers are slow to reduce it. So, when the card is advanced, all contracts at a lower rate must be filled at the lower rate, though wages are paid on the advance. It might be thought that this would work both ways, and that when the card declined, the orders at the higher rates would be filled at these rates, while the work was done at the lower; but it is a well-known fact that when the card declines the price for contracts follows it. It should not be so, but it is so. Now, as to the action of the English scales and the realized prices. In the recent arbitration the employers said:

It is exact and systematic, and its variations are the result of the prices realized by the firms whose books are examined. No other method has yet been suggested which would give the same realized figure, including every extra obtained, on all sizes, qualities and descriptions of iron. It has enabled the employers of the North to provide regular work for their men, and the development of the Northern iron trade has been the result of the system. It has given better earnings to larger numbers of workmen than can be shown in any other European iron-producing center, and steady work has in many instances been accompanied by economy and thrift, as can be seen in the more comfortable homes of many of the members of the board. Comparison was invited between the position of the ironworker and that of the collier, ironstone miner, and most of the leading classes of North of England operatives, and the result would, it was believed, clearly prove that although selling prices have not been so high as either employers or operatives could have wished, these have been under the sliding scale system correctly ascertained, and wages fairly determined. Since the year 1874 the rates of wages in the North of England have been repeatedly fixed, and the various settlements are now annexed to show the relative selling prices and the rates which have been adopted, and the numerous arbitrations of this district may be pointed out as an indication of the exactness with which the wages of the ironworkers have since that date been based on the figures of the accountant.

DERBY SCALE, BY AGREEMENT BETWEEN STAFFORDSHIRE AND THE NORTH OF ENGLAND.

	Selling Price, £ s. d.	Wages, s. d.
May 31, 1874.....	10 18 11 7 8	11 9
August 31, 1874.....	9 19 1 1 10	10 9
November 30, 1874.....	9 1 5 1 9	9 9
February 28, 1875.....	8 14 3 0 0	9 0
ARRANGED MUTUALLY AT DARLINGTON, FOR SIX MONTHS TO DECEMBER 31, 1875.		
July 15, 1875.....	8 3 1 2 3	9 0
MESSRS. WILLIAMS AND MUNDELL'S AWARD, DATED JANUARY 18, 1876.....		
January 18, 1876.....	7 10 4 0 9	8 3
MR. DALE'S AWARD, DATED		
April 13, 1876.....	6 7 4 0 1	7 6
MR. LEFEVRE'S AWARD, DATED		
January 13, 1879.....	6 0 5 7 7	7 0

The sliding scale came into operation May 1st, 1880.

THE AVERAGE REALIZED SELLING PRICE FOR THE QUARTER ENDING

March 31, 1880.....	6	2	11.45	7	9
June 30, 1880.....	6	10	8	8	0
September 30, 1880.....	6	8	0.01	8	0
December 31, 1880.....	6	4	3.96	7	9
March 31, 1881.....	6	3	7.45	7	9
June 30, 1881.....	6	2	1.74	7	6
September 30, 1881.....	5	10	8.04	7	6
December 31, 1881.....	5	18	11.18	7	0

offers an incentive to gigantic speculation, usually taking the form of "corners," from which the country at large suffers beyond computation. There is not a mechanic or humble laboring man who does not to-day feel the blighting curse. The following table gives the names and membership of the several exchanges located in New York, and the value of seats:

	Members.	Value of Seats.
Produce Exchange.....	3,000	\$2,500 @ \$5,600
Stock ".....	1,100	150 @ 30,000
Maritime ".....	2,000	150 @ 250
Mercantile ".....	800	100 @ 250
Cotton ".....	400	100 @ 5,300
Petroleum ".....	301	100 @ 2,300
Am. Min'g ".....	280	100 @ 800
New York ".....	450	100 @ 1,200
Coffee ".....	113	100 @ 385
Sugar ".....	100	100 @ 175
N. Y. Iron and Metal Ex.....	105	100 @ 40
I. & M. Ex. Co. (limited).....	105	100 @ 40
Hay Exchange.....	300	100 @ 90
Building Material Ex.....	300	100 @ 40
Mech. & Traders' Ex.....	150	100 @ 40

In a general survey of the foregoing, it is to be observed that the later attempts to organize exchanges in the trades have not, in every instance, been a signal success. For example, we miss from the list the Tobacco Exchange, organized a few years ago with considerable éclat. It had a short life, for from the nature of the article it was found impracticable to establish a scale of standards to serve the purposes designed. Neither do we find the new Sugar Exchange. Although it has a nominal existence, it is virtually defunct. From the start, refiners and many of the importers refused to do business in it, and permanent injury resulted to the trade. Refiners resorted very largely to the practice of buying their goods "cost and freight" to come to them direct, so that the old legitimate importing trade was almost broken up. The refiners regarded the rules as arbitrary, but the main objection given was that the exchange fostered speculation—i. e., dealing in "futures," or buying and selling goods which were not actually in hand.

Another experiment of like nature is being worked out in the Coffee Exchange, the object of which, more especially, was to regulate brokerages. The jobbers, however, are much against it. As one of them remarks: "The brokers got up a line of standards, but 'as no two lots were alike it was impossible 'to have a standard.' Speculation, too, formed a lively element, as was illustrated not long ago, when this market ruled $\frac{1}{2}$ to 1 cent lower than the producing market. This was because importers bought more coffee than the country could absorb, but the purchases were insolvent, and buying on 90 days they attempted to tide over a critical period, but ended in disastrous collapse.

The Produce and Cotton Exchanges both enjoy extraordinary prosperity, and both actually handle enormous quantities of merchandise in daily cash transactions. The new building for the former, now in progress opposite Bowling Green, will be a permanent structure, grand in proportions and design, and the Cotton Exchange, in like manner, will proceed to erect a building, commodious and elegant, on the present site of the Maritime Exchange, as soon as their title to the property can be secured.

The latest, and perhaps most interesting, of the experiments in this line are the two iron and metal exchanges lately established in this city. They are too new, as yet, to be judged by what they have accomplished, and wide differences of opinion as to their probable success are expressed by the trades more or less interested in them. The history of these exchanges is so well known to those of our readers who have followed our comments from week to week, that it need not be gone over here. The gentlemen interested in establishing the Iron and Metal Exchange Company, Limited, evidently sought to defeat the scheme of organizing an exchange on the plan proposed by those instrumental in calling the meeting of February 15. It seemed to be inevitable that one exchange would be organized, and the committee appointed by the chairman of that meeting took the unusual course of organizing what should be an exchange in name, rather than in fact. It was, we have no doubt, expected that this movement would prevent an organization under the management of the brokers, but this expectation was disappointed. A great many of those who felt themselves discriminated against were in no mood to be quietly suppressed, and the second exchange was organized on the plan originally contemplated. It still remains to be seen, however, whether either exchange can succeed in establishing itself as a power in the trade. The business thus far done on the floors of these exchanges does not seem to have been of much consequence. Unless we are much mistaken, most of it was previously arranged between the parties in interest, and could as well have been completed where the details were arranged as on 'Change. We doubt if the daily calls have led to any business which would not have occurred as the result of private arrangement between buyer and seller. Indeed, we fail to see how, without such arrangement, the otherwise serious obstacles to the purchase and sale of iron and metals could be overcome. It is easy to fix arbitrary standards and to adopt codes of rules for the settlement of all disputes likely to arise; but in legitimate transactions in metals there are considerations vastly more important than any which can be anticipated by a code of rules. If a transaction is purely speculative, it can be conducted as well under a code of rules as in any other way. If, on the other hand, the buyer is or represents a consumer, and buys to meet his own or his client's actual wants, he would scarcely feel safe in

making or accepting a bid, and for this reason the business actually done "on call" has been small, and, we suspect, chiefly for effect, being based on full previous understanding between buyer and seller. This sort of business cannot long be either entertaining or profitable, and we are not surprised to learn that, in response to a petition bearing many signatures, the Board of Managers of the Iron and Metal Exchange Co., Limited, have unanimously decided to abandon public calls. The reason for this action was that a majority of those who have the privilege of the floor of the Wall street exchange have, from the first, looked upon the calls as a farce, and the business supposed to result from them has been regarded as done chiefly for effect. The opinion is generally entertained that most of it was by previous arrangement between buyer and seller, and that it could as well have been completed when the details were arranged as on 'Change. But, however this may be, the fact that the abolition of the call was generally desired by the members, and unanimously agreed to by the managers shows that at least it has served no good purpose, but has been an annoyance and an embarrassment. The managers were, we think, wise in returning to the original plan of making the exchange a daily meeting place for those who choose to come, whether for business or for social intercourse.

In the Pearl street exchange a very different policy is likely to be adopted. There the calls are the principal feature, and their abandonment would probably deprive the exchange of its only excuse for being. It is a fact, however, that by many in the trade the prices bid and asked and the transactions reported are not accepted as indicating the actual condition of the market; they will probably be continued, nevertheless, unless the now small attendance should be reduced to the secretary, president and janitor. If these calls were all the managers designed and still hope to make them, they would undoubtedly interest the members a great deal more than they do. We understand that the season is unfavorable to a large attendance, and that the calls will attract more attention during the fall and winter than at midsummer; but, "business is business," whether the thermometer records 19° or 90°, and thus far, we fear, the calls in the Pearl street exchange have been more talk than business. This, at least, is the impression in trade circles.

We are not prepared to say that an Iron and Metal Exchange is not possible in New York, but we incline to the belief that existing conditions do not favor it. Our warehousing system is imperfect, and cannot be reorganized in the present relations of production and consumption. In iron and domestic metals there is a tendency in the direction of more intimate relations between producer and consumer, and the wants of an enormous consumption may be supplied so quietly as to leave the general market in a condition of dullness approaching stagnation. The consumer is likely to prefer these direct transactions with makers to any other system of purchase, especially as it enables him, without speculation, to anticipate his estimated wants by placing contracts for what he is likely to need in future. This kind of business can neither be facilitated nor discouraged by an exchange, and it is an open question whether what is left is enough to justify maintaining even one exchange. The Wall street exchange is a convenient meeting place for those who have acquired the privilege of the floor, but beyond this we fail to see that it has any important function. The Pearl street exchange has a much larger ambition, but we do not see just how it is to be realized. We are not disposed to attach much weight to the prediction that it will develop hurtful speculation on a large scale, for the reason that its members cannot possibly control the metals they deal in, nor seriously influence the market by fictitious quotations in the absence of actual business. We may exaggerate the obstacles to the success of our iron and metal exchanges, but they seem to us insuperable. However, they are likely to have a fair trial, and, as each is certain to live a year at least, we shall better know twelve months hence whether either has been of enough benefit to the trade to hold its membership. Experience in other trades has shown that it is easier to organize exchanges than to keep them alive, and that starting off with éclat does not insure success. If an iron and metal exchange in New York is not needed, it would be impossible to sustain one—much less two. If one is needed, we shall probably witness the operation of the law of the survival of the fittest, and predictions at this time would be neither safe nor in good taste. It is perfectly evident, however, that should a Kilkenny cat-fight develop between them, it would end in victory for neither and death for both. In avoiding this the members of the Pearl street exchange are wise.

The proposed correction by Congress of the decision of the Treasury Department, under which hoop iron in the shape of cotton ties has been imported at about one-half the rate of duty imposed upon it by the tariff act, has caused quite a stir among those interested in cotton, and statements which, to say the least, are questionable have been sent in hot haste to Congress. The plain fact about this matter is that there is neither justice nor equity in admitting cotton ties at a less rate of duty than the hoop iron out of which they are made. There is no justice in compelling a party who wishes to use 1" X No. 18

hoop for barrels to pay 1½ cents per pound duty while 1" X No. 18 hoops for cotton ties pay ¾ cents. This was not the intention of the law, and it is against the spirit, and, we believe, the letter of the law to permit it, and if it is permitted under Treasury decision no time should be lost in so changing the law as to make it impossible that it shall be continued. The statement that this addition will ruin the planters or seriously affect them is absurd. If they had to pay the whole additional duty, which they will not, it would make a difference in cost of 8½ cents to a bale of cotton. We do not recall the weight of a bale of cotton, but say 400 to 500 pounds, an almost insignificant sum per pound. When, in addition to this, it is considered that for these ties, for which the planter pays, say, 3½ cents a pound, he gets the price of cotton, the hardship is not manifest. There are 11 pounds of ties to a bale of cotton. With cotton at 11½ cents and ties at 3½ cents, the profit would be 8 cents a pound, or 88 cents a bale of cotton—ten times as much as the proposed increase of duty. It is argued against this statement that this profit is not made; that in selling the cotton, though no tare is deducted, the fact that this iron is paid for reduces the selling price of the cotton. No one who understands the selling of cotton can honestly say this. Cotton baled with iron ties is worth more in the New Orleans markets than baled with anything else, or loose. Indeed, to a larger portion of the trade baled or tied with anything else than iron, it could not be sold. Instead of the ties reducing the cost it increases it.

The Brooklyn Bridge.

The following appears in a daily paper: Specifications have been prepared by the engineers of the East River Bridge for elevated termini for the railroads over the bridge, with waiting rooms and ticket offices. On the New York side the terminus is to be 30 feet from Chatham street, and will be 250 feet long, 52 feet wide, and two stories high. The top platform is to be on a level with the New York Elevated Railroad, so that trains can be switched upon the bridge. Upon the ground floor there is to be a waiting room, 12 x 40 feet, finished in Georgia pine, with black walnut wainscoting, and there is also to be a ladies' retiring room. Three ticket offices are to be placed on each side of the waiting room, the plan being to adopt the same method of collecting fares as at Fulton Ferry. An iron stairway is to be constructed from William street, to provide an entrance in addition to the main entrance, and iron railings will separate the footpath and the roadway below. In Brooklyn a duplicate of this building will be erected, with a slight modification made necessary by the curve of the roadway to Sands street. The specifications provide for the completion of the buildings by Jan. 1, 1883.

This is only another blind, and additional dust thrown into the eyes of the people, as it is a well-known fact that no application has been made to the Legislature yet for establishing approaches to the bridge. The requisite formalities would require about a year, and if the ring intended to finish the bridge within that time they would have provided for the Brooklyn approach long ago. It is no secret that they have already commenced talking about an additional appropriation for this purpose. Where, then, is the use of issuing these specifications, especially since the bridge is not intended to be finished until the Rapid Transit Ring have arranged their plans for railroad connections, and are yet waiting for the election of a Mayor and Governor favorable to their nefarious plans?

It cannot have escaped the notice of intelligent workmen that a majority of the strikes which have occurred during the last year and a half, not to go further back, have been what may be called strikes against reason. The men have made demands which could not be acceded to by the employers, or have resisted reductions which the condition of business rendered imperatively necessary. Intelligent arbitration would probably have prevented many of these strikes, but arbitration is not regarded with favor by workmen in this country, and has never become an established principle in the regulation of labor disputes. We think it probable that, in a few years, its practical advantages will be recognized on both sides; but, in the meantime, why would it not be well for the trade unions to organize, from their own membership, well-chosen committees to carefully examine and report upon all facts of interest affecting the relations of labor and capital? Committees of this kind could gather a great deal of valuable information, in which the membership of the unions would feel great confidence. While manufacturers will not, as the rule, confer with committees from unions who come to them with improper demands, they would, we are assured, be glad to talk with committees seeking information, and would truthfully lay before them the facts of their business as regards cost and selling prices. Such committees could also gather a great deal of valuable information respecting the general condition of trade throughout the country, and could in many ways intelligently advise the unions as to the timeliness of proposed strikes, and the probable issue should they be declared. We are confident that, had such preliminary investigation been made, most of the strikes now in progress would never have been begun. The members of the Amalgamated Association of Iron and Steel Workers seem to be the only ones in the country who did not know that the strike of the Pittsburgh mill operatives on the 1st of June was a fatal mistake. The striking operatives of the cotton mills in New England seem to be totally ignorant of the actual condition of the business at this time, and it is quite certain that their leaders, even

if they knew it, would not tell the men anything likely to discourage them. The plan we propose is certainly one which merits favorable consideration, and if well-chosen committees are appointed from each of the trade unions to investigate all conditions affecting the interest of the wage-earning class, we have reason to believe that the relations between labor and capital will at once become more harmonious, because based upon a clearer conception of what those relations actually are.

British Railway Management.

The committee on British railway rates and fares which has for some time past conducted investigations of complaints against the management of railways, has now arrived at a final decision, and a report embodying all particulars will shortly be presented to Parliament. Two reports had been previously submitted to the committee, one by the chairman and the other by one of the members, the latter being adopted as the basis for the deliberations which were commenced shortly after. The two reports contain points of considerable difference, that of the chairman advising an extensive amalgamation of English Railways, owing to the present costliness of traffic which results from multiplicity and want of harmony in the management. The report favored by a majority of the committee, on the other hand, does not touch upon this at all, and is somewhat more antagonistic to the interests of railroad companies, declaring that it is scarcely allowable for the latter, with a monopoly of goods traffic, to endeavor to bribe consumers at a distance to compete with those at hand by offering cheap rates which will neutralize the advantage of vicinity to the market. It is suggested that a uniform classification of traffic for all railways would be a great advantage, and Mr. Barclay, the author of the favored report, thinks that while there was an increase in rates following the rise in the prices of materials in 1879, the railway companies have forgotten to reduce their rates now that materials are cheaper. The chairman's report, however, points to the fact that the accusations against the companies have not been established; that they often charge less than they lawfully might; that increased charges for improved facilities for receiving or unloading are perfectly just, and that exceptional rates may be regarded as on the whole conducive to public benefit. An important feature of Mr. Barclay's report is the recommendation that a small department in the Board of Trade should be created for the special purpose of taking cognizance of the complaints by the public against the railway companies, for the violation either of their special acts or of the public statutes. It would be the duty of this department to investigate complaints where well founded, to require redress, and, if necessary, to take the railway companies before the commission. The committee is unanimous on the necessity of a system of through rates on canals, and on the propriety of arming the Railway Commission with authority for hindering the more immediate subjects of its jurisdiction from depriving their customers of the privilege of choice between a truck and a barge. Both reports acknowledge the necessity of redress for well-founded complaints of excessive charges, but differ in regard to the question whether existing laws offer ample protection against such actions. The changes advocated and measures to be adopted in connection with the subject have been moderate, considering the numerous complaints made, and it is to be hoped that the efforts of the committee intending to remove existing difficulties will be appreciated.

Locomotive Practice.

There are some indications that locomotive practice in regard to pressures may undergo a decided change. For many years the locomotive boiler has carried in regular practice pressures far higher than those thought practicable in either marine or stationary practice. Recently both land and marine engines have been employing much higher pressures than formerly, and locomotive practice in this particular is no longer exceptional. Mr. Underhill, the superintendent of the motive power of the Boston and Albany Railroad, has recently been constructing a locomotive boiler intended to carry 160 pounds per square inch. It does not differ in any very marked degree from the ordinary locomotive boiler, save, of course, in the details, but it is exceedingly interesting as indicative that the master mechanics are beginning to wish for a greater economy in the use of steam. The cylinders are of somewhat unusual proportions, 18 x 22, and it is evidently the intention to make a step in advance in the matter of economy.

The great difficulty in improving the locomotive engine is the restricted size of its fire-box. Until some new form of boiler is introduced, or some of the well-known plans for its enlargement adopted, or some change made in the general design which will enable a larger fire-box to be used, we think that the designers will have great difficulty in effecting more than small improvements. Probably no one thing has occasioned greater difficulty in obtaining powerful engines for very high speeds than the necessity for placing the fire-box between the driving wheels. The suggestion made not long since by one of our most eminent engineers, to turn the locomotive boiler end for end on its frame,

is a step in the right direction. Probably the Forney engine, with its tank and coal upon the leading truck, could be made to give greater power and economy than any of the ordinary forms of "American" engines. In the Forney engine there is practically no limit to the width of the fire-box or fire-box end of the boiler. The engine can be made as wide as the rolling stock. With ample fire-box, large fire surfaces and ample room for tubes, an unlimited supply of water can be obtained. The same result is secured in the well-known Wootton engine, so largely used upon the Philadelphia and Reading Road. In this design the fire-box is spread out over the wheels, and the width is only limited by the standard width of car. Both styles will doubtless be largely adopted as the demand for high speed and more power becomes more imperative.

The Employers' Liability Act in Great Britain.

The Employers' Liability Act, as now in force in Great Britain, and to which we have quite recently referred editorially, still continues to agitate both miners and colliery owners. It is evident that the act in its present form will at no time offer a ready solution of the difficulties which are of daily occurrence, and a radical change in the system appears to be in urgent demand. The agreements which are in many cases entered upon between workmen and their employers meet existing requirements within certain limits only, and some short time since a case raising a question of vital importance in this connection attracted considerable attention. The point was whether a workman can by contracting himself out of the act, also contract his widow out of it in case he is killed by any accident in his employment. The London Mining Journal, referring to the case, says:

The question had arisen in the collieries of the Earl of Dudley, which are very extensive, and in which there are some thousands of men employed. Under the act there is a kind of club, for the purpose of paying compensation to members in the event of their being disabled by sickness or injury, and to their widows and children in the event of death caused by accident in course of employment. To this club Lord Dudley contributes a sum equal to the amount subscribed, and which, it is understood, is very large. Just before the act came into operation there was a meeting of the men, who agreed to accept the conditions of employment offered to them by the Earl, among which was an express stipulation that neither the workmen nor their representatives should avail themselves of the provisions of the act by actions against him for compensation; and there was also evidence that these conditions were posted up in conspicuous positions in the collieries. One of the men had lost his life in a colliery accident, and his widow sued for compensation. The County Court Judge decided that the widow had rights of her own under the act which no contract made by her husband during his lifetime could deprive her of; he, therefore, gave judgment in her favor.

The Earl of Dudley appealed, and in the subsequent proceedings the decision of the Judge of the County Court was reversed, thus legally sanctioning the right of "a workman contracting himself out of the 'responsibilities of the Employers' Liability Act.' The importance and justice of this decision are out of question, clearly showing, at the same time, that the intended purpose of the act may be easily and successfully avoided.

It is in this connection that a few suggestions concerning the establishment of miners' orphanages would not seem out of place, and the proposals which, it is stated, have lately been mooted in Great Britain for this purpose are worthy of sympathy and encouragement. Such establishments, if scattered throughout the mining districts of the country, would not fail to meet with universal approval, and, decisive measures being once adopted, valuable aid would undoubtedly be rendered from many quarters. Judging from the flourishing condition of the different mining institutes, there seems to be no reason why establishments of the kind mentioned should not share an equal success, and small weekly contributions from the miners, combined with donations from wealthy colliery owners, would supply the funds necessary for their maintenance. Our worthy contemporary, the Mining Journal, has calculated that if the 9000 men who work underground in the lead and copper mines of Cornwall and Devon were to subscribe only one penny per week, a sum of about \$15,000 would be available at the end of the year for the most benevolent of purposes. The much larger number of coal miners would turn out the vast sum of about \$388,000, and if colliery owners could be induced to give the same amount as the men, ample means would be at hand with which to commence operations. It is to be hoped that the project now under consideration will not be abandoned, and with the liberal support that may certainly be expected, we do not doubt its ultimate success.

Hiram Dexter, who died yesterday at his residence, 209 West 32d street, this city, was one of the oldest American manufacturers. He was born in Roxbury, Mass., in 1801. In early life Mr. Dexter, associated with his father and brother, began the manufacture of the first axes made in America. Subsequently, coming to New York State, he became superintendent of an ax factory at Dobb's Ferry, and still later he removed to Paterson, N. J., where he had an ax factory. He afterward became interested in the erection of the first malleable iron works constructed in the United States. Later in life he engaged in the manufacture of saddlery hardware, in which he continued up to within a few years of his death. The deceased leaves a wife and two sons. Death was caused by pulmonary consumption, from which he had suffered for many years.



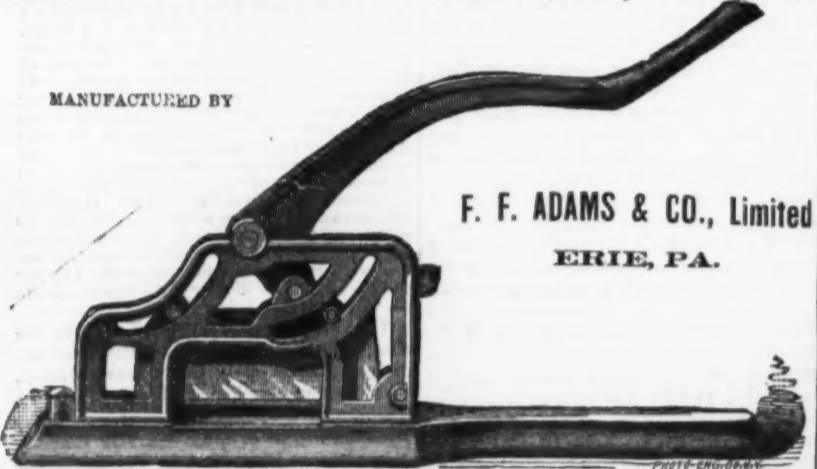
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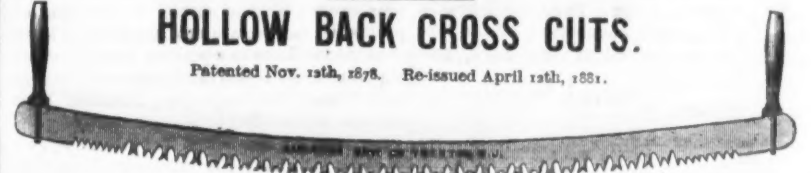
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This cut represents the style of our several sizes of Farm Bells.

These Bells are manufactured by a secret process, and from the VERY BEST QUALITY OF BELL METAL. For volume and richness of tone they have no equal.

A very liberal discount to the trade. Send for price list.

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Barb Wire Machines a Specialty.



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"ANCHOR" SNATCH BLOCK.

Does away with the old Shackle Pin and Chain.

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MOLDING SAND AND FOUNDRY FACINGS.

OUR STOVE PLATE FACING IS INDORSED BY THE LEADING STOVE FOUNDERS

Read the Following Testimonial:

Office of **FULLER, WARREN & CO.,**

Troy, N. Y., February 21st, 1882.

To Whom it May Concern:

We have during the past four months used about 75 barrels of the "WHITEHEAD STOVE PLATE FACING," and find it the best and most economical that we have ever had in our Works, and shall continue to use it while supplied with the present quality. This Facing is manufactured by the **AMERICAN FACING CO.,** 515 West 15th Street, New York City. A. H. EATON, Superintendent.

SHOVELS, RIDDLES, BRUSHES, &c.

WHITEHEAD BROS.
AMERICAN FACING CO.
515 and 517 West 15th St., New York.

WM. WHITEHEAD, Treas.,
517 W. 15th St.,
New York.

LITTLE GIANT WIRE STRETCHER.

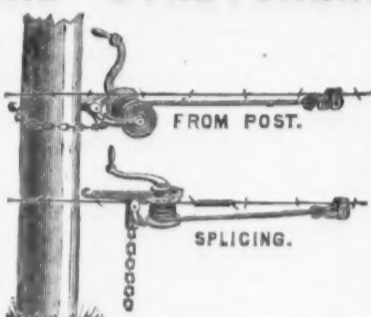
READ.

This is the only Stretcher made with a SELF-ADJUSTING SLOTTED LATCH that will adjust itself to the HATCHET, either side of the post, or at either end of the wire, or either side up, the crank turning at all times in one direction, which is necessary, for reversing the crank would reverse the rope. Stretchers so constructed that the latch will drop down, except when in a certain position, are well nigh, yes, quite worthless.

Hook the eccentric at the end of the rope to the wire, now wind up and a little child can break any wire ever made. For splicing wire, place one end of the wire under the lip eccentric on the frame, and the other end to lip eccentric at end of rope; now draw them together and splice. For raising hogs, cattle or any other weight it is indispensable. It is far superior to a hook fastened to one side of the post as, when the ground is wet, the strain being on one side, has a tendency to loosen and turn the post. This Stretcher BEING FASTENED TO THE POST, it is not necessary for one man to HOLD IT UP while another operates it, and follows it en route to the post. One man standing at the post operates the LITTLE GIANT alone, and very easily.

Price \$1.50 Each. Discount to the Trade.

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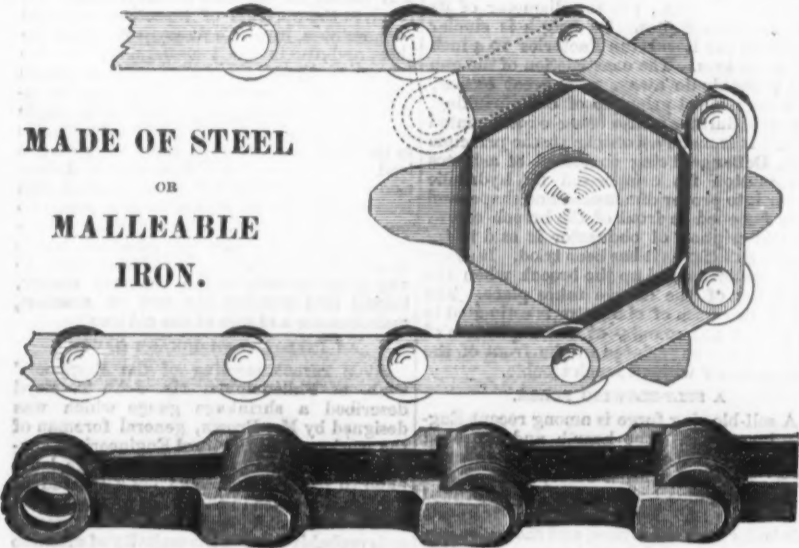
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CHAIN BELTING FOR TRANSMITTING POWER.

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Is a substitute for Leather Belting and Cog Gear Wheels. Has GREAT STRENGTH and durability. Positive motion, no slipping. Can be run at almost any desired speed. Is especially adapted for running Heavy Shafting, Elevators, Hoists, Drags, Nut Coal Elevators and Screens, Agricultural Machinery, R. R. Cars, Trains in Rolling and Rail Mills, Dredging and Ditching Machines, Lifting Cranes, Saw-Dust and Tanbark Carriers &c. Manufactured and sold by

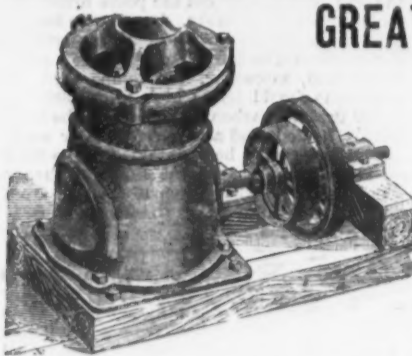
THE LECHNER MINING MACHINE CO.,
J. A. JEFFREY, President. COLUMBUS, OHIO.

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Pipe Cutting and Threading Machine,
BEWARE OF IMITATIONS.
None Genuine without our Trade Mark and Name.
Steam and Gas Fitters' Hand Tools.
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GREATEST ROCK BREAKER ON EARTH.

CAPACITY { A TON A MINUTE.
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Guaranteed to do Double the Work of any other or Money Refunded.
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THE DEAN LEMON SQUEEZERS.

(Patented Feb. 7, 1882.)
SOLD TO JOBBERS ONLY.
Price List—Dis. 4 & 5.

No. 1. \$15 per doz. (No. 2. \$5.50 per doz.)

When the Squeezers cannot be obtained from the Jobbers, send orders direct. Samples sent for \$1.50. Mention this paper.

WM. B. DEAN, 43 Murray St., N. Y.

A. B. DEMING, Traveling Agent for Jobbing Trade

WM. THOMSON & CO., Toronto. Sole Agents for Canada.

Letters Patent of the United States were issued to Wm. B. Dean for improvement in Lemon Squeezers, consisting among others in supplying them with legs and with a removable juice cup held in a frame.

Now this is to notify all persons making, vending or using Lemon Squeezers with the said improvements, or either of them, that I will hold them responsible in damages for infringement of the said patent.

WM. B. DEAN, 43 Murray St., N. Y.



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OF LONDON, ENGLAND.

Have Established an Agency at No. 14 Stone Street, New York.

This Agency invites correspondence from manufacturers of reputable goods of all classes suitable for exportation. Catalogues and Price Lists, accompanied by lowest quotations for Export, are solicited.

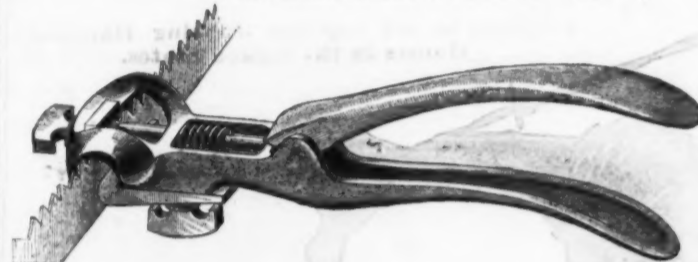
The Company, through its traveling and resident Agents abroad, will give especial attention to

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And manufacturers of such are invited to call at this Agency.

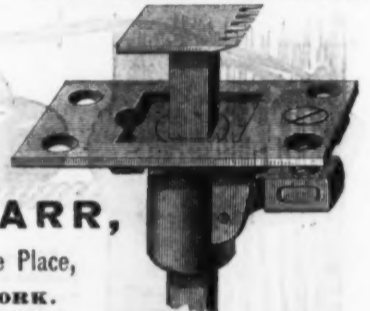
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Boys Tricycles,
Bicycles and Wagons,
with Steel Spokes to imitate
Nickel plating.

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THE TRICYCLE MFG. COMPANY,
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THE CELEBRATED PATENT AIR SPACE COVERING FOR STEAM BOILERS, HOT WATER PIPES, REFRIGERATORS, MEAT CARS, ICE HOUSES AND HOT AND COLD WATER PIPES. Easily applied by any one.

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NATIONAL STEEL TUBE CLEANER for cleaning Boiler Tubes

Saves its cost every time it is used, and is endorsed by the best engineers.

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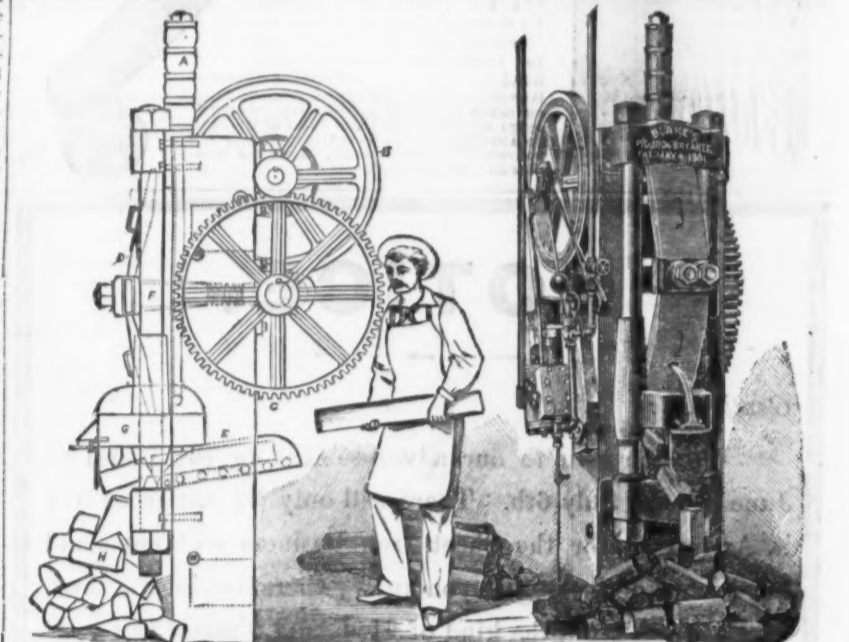
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BLAKE'S PAT. PIG IRON BREAKER.



A new and successful machine for breaking pig iron into any length desired, with rapidity and economy. Besides saving in cost of breaking by hand, it secures the greatest economy in melting. Several machines already in use. Every machine guaranteed against breakage of parts. Requires but three horse power. Can be run by belt or have small engine attached.

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The American Dynamo-Electric Machine,

For Electro-Plating, Electrotyping, &c.

Requires no Water.

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WASHINGTON NOTES.

(From Our Own Correspondent.)

WASHINGTON, D. C., July 26, 1882.

THE IRON AND STEEL TEST COMMISSION.

Under the call of committees of the House of Representatives, the Committee on Manufactures having been reached, Mr. Campbell, chairman, moved to suspend the rules and pass the bill, authorizing the President to appoint a commission of experts, skilled in the investigation, production and use of metallic substances and other structural materials to execute tests and experiments on iron and steel, and other materials used in the construction of bridges, buildings and mechanical structures, and to deduct useful rules therefrom. The bill, which provides for a commission of seven members, selected from among men skilled in the investigation, production and use of metallic substances and other structural materials, with the accompanying report, has already been published in this correspondence. Mr. Cox, of New York, immediately objected to the passage of this bill. Mr. Hewitt, of New York, urged its passage, calling attention to the Government testing machine at the United States Arsenal, Watertown, Mass., for which the inventor, Mr. Emery, received a medal, and which is kept in operation for the purpose of making "sporadic tests" of specimens sent by private individuals who desire information as to the strength of materials they proposed to use. "But what is wanted," said Mr. Hewitt, "is a systematic regulation and organization of these tests." He said that the societies of Mechanical Engineers, Civil Engineers and Mining Engineers, the three great practical scientific bodies of the country unanimously recommended the bill and its objects. He then showed the importance of these tests and their advantage to the mechanical industries. Mr. Converse, of Ohio, opposed the bill, having become somewhat mixed respecting certain experiments made by Colonel Laidley, United States Army. Mr. Hewitt, of New York, endeavored to correct the gentleman, but found him so obtuse that his efforts were in vain. Mr. Candler, of Massachusetts, made a forcible speech in favor of the bill. Mr. Browne, of Indiana, made an attack upon, as he called them, "distinguished scientists, who have a patriotic inclination to scientific research, but who always seem to desire that their patriotism be supported by an appropriation out of the Treasury." Browne then displayed his ignorance of the provisions of the bill, and was brought up with a round turn by General Campbell dryly asking, "Who is it now who has not read the bill?" To which Mr. Candler replied, "I think the gentleman (Mr. Browne) has not read the bill." After a running debate the question was taken, and the tellers reported: ayes, 92; noes, 55. Two-thirds not having voted, the rules were not suspended, and the bill was not passed, the bill lacking but six of the required vote. Unfortunately a number of friends of the measure were absent. General Campbell will make another effort when an opportunity offers under a suspension of the rules. Should it be reached on the calendar, there is no question of its passage, as it has a very decided majority in its favor.

THE NATIONAL MINING EXPOSITION.

Judge Kelley, to whom an invitation was extended some time since to deliver the address at the opening of the National Mining Exposition at Denver, on August 1st, will leave here on Thursday for that purpose. His remarks will relate to the mineral resources of the West, and the vast amount of capital, labor and mechanical appliances employed in their development. It is proposed, according to the letter of invitation to Judge Kelley, to make this exposition a permanent institution. The building makes a fine architectural display, is built of brick and cost \$250,000. This laudable enterprise is under the management of a corporation.

THE COMMITTEE ON WAYS AND MEANS.

The House of Representatives has granted permission to the Committee on Ways and Means to sit during the recess of Congress, with instructions to assemble at Washington for the preparation of revenue bills on the second Tuesday of November next. The object of asking this authority, as stated to the House by Mr. Kasson, is that the Tariff Commission being required to report from time to time, the Committee on Ways and Means deem it important, in order to facilitate action and to get the subject properly before the House, that the Committee on Ways and Means should take up the consideration of those reports immediately after the fall elections, and before the meeting of Congress, in order to get their bill in a very forward state of preparation before Congress assembles. The Committee are evidently determined to bring the results of the Tariff Commission inquiries to a prompt test before the House, thus setting aside the charges that nothing will be attempted by this Congress.

JUDGE KELLEY ON THE REVENUE BILL.

Judge Kelley, speaking of the probable outcome of the Internal Revenue and Tariff bill in the House, says that the amendments to the House bill reducing the tax on tobacco, sugar and Bessemer rails will strengthen it in that body, and if not modified more radically than provided in those respects, it will be promptly passed. The House is anxious to have the Senate get through with the bill and send it to them for concurrence.

THE BECK TARIFF AMENDMENT TO THE REVENUE BILL.

Senator Beck, of Kentucky, having prepared an amendment to the tariff items of the Internal Revenue bill, providing that on and after the 1st of July, 1883, no tax shall be levied in excess of 50 per cent. ad valorem on certain schedules, in explanation of its effect says that those taxes, now over 50 per cent. can be reduced to 50 per cent. with a loss of only \$15,000,000 of revenue, and, as he claims, a relief of over \$200,000,000 to the tax payers of the country. In a table explanatory of this amendment, prepared by Mr. Morrison, a representative from Illinois, and submitted by Mr. Beck, the following relates to the schedule of metals:

Articles.	Average ad valorem rate of duty.	Amount of duty received in 1881.	Estimated loss of duty.
Iron and manufactures of:	Per cent.	\$695 25	\$113.25
Band, hoop, and scroll iron, from 1/2 to 6 inches wide, not thinner than 1/4 inch.	54.63	47,261.13	3,366.13
Under 1/2 inch and not thinner than No. 20 wire-gauge.	64.46	127,511.16	7,123.66
Thinner than No. 20 wire-gauge.	66.52	4,645.92	349.50
Bar iron, rolled or hammered, comprising flats, less than 1/2 in h or more than 6 inches thick, or less than 1 inch or more than 6 inches wide; rounds less than 1/2 of an inch or more than 2 inches in diameter, and squares less than 1/2 of an inch or more than 2 inches square.	57.66	89,612.21	11,904.23
Cable and cable chains.	74.52	1,242.01	470.00
Cut nails and spikes.	59.35	127.18	5.72
Cut tacks, brads and sprigs, not over 16 ounces per thousand.	59.35	15.43	2.43
Cast-iron steam, gas and water-pipe, vessel, stoves and stove plates.	53.49	2,713.00	176.84
Chains, hater, trace and fence:	58.25	30,097.59	4,254.88
Not less than 1/2 inch in diameter.			
Less than 1/2 inch in diameter and not under No. 9 wire-gauge.	51.08	25,787.76	547.26
Hollow-ware, glazed or tin-plated.	82.12	1,779.75	605.75
Locomotive tires or parts thereof.	64.44	73,940.31	5,355.31
Round iron in coils 1/16ths of an inch or less in diameter, coated with metal or not so coated and all descriptions of iron wire, and wire of which iron is a component part, not otherwise provided for.	73.47	36,185	150.10
Sheet iron, common or black, thinner than No. 20 wire-gauge.	51.16	16,891.94	381.94
Wire, bright, coppered, or tinned, drawn and finished, not under than one-fourth inch in diameter—Not less than No. 16 wire-gauge.	71.35	66,250.82	12,324.03
Over No. 16 and not over No. 25 wire-gauge.	61.15	383.83	70.73
Wire rope, strand or chain, either bright, coppered, galvanized or coated with other metal, subject to the same rates of duty imposed on iron wire, of which the same are composed, not over one-fourth inch in diameter—Not thinner than No. 10 wire-gauge.	58.41	37,714.47	4,421.78
Over No. 16 and not over No. 25 wire-gauge.	59.62	7,551.65	1,207.15
Wrought hinges, bed-screws, board-nails, spikes, rivets, and bolts.	59.95	6,254.89	949.83
Wrought-iron railroad chairs, fish-plates and nuts and washers, punch-d.	131.36	18,695.05	11,578.03
Wrought, steam, gas and water tubs and flues.	82.61	3,954.58	1,504.06
Steel and manufactures of: Files, file-blanks, rasps, and rasps, exceeding 10 inches in length.	57.71	2,109.46	2,675.95
Railway bars or rails, with or without steel.	76.30	4,954,691.31	1,604,076.95
Bars, flat, not over 1/2 inch in length.	63.74	10.23	2.33
Wire, not less than 1/4 inch in diameter, valued at 7 cents or less per pound.	65.19	1,761.44	470.44
Wire rope, strand or chain, &c., valued at above 7 cents per pound.	61.26	77.80	14.30
Lead: Old scrap, fit only to be remanufactured.	67.66	1,845.27	48.77
One and dress.	92.49	80.72	41.22
In pigs, bars, and molten.	54.32	86,411.36	7,876.82
Silver leaf, in packs of 50 leaves.	102.01	937.50	478.00
Total Schedule E.		5,465,789.45	1,714,311.77

RECAPITULATION.

The total duties in 1881 on all the schedules affected by this amendment, viz: A, cotton and cotton goods; B, earthenware and earthenware; C, hemp, jute, and flax goods; E, metals; F, provisions; G, sugars; H, silk and silk goods; I, spices; K, wood; L, wool and woolen goods; M, sundries—aggregated \$86,230,666. The estimated loss is \$15,061,742. Of these amounts metals contributed \$5,465,789 in revenue, and the estimated loss would be \$1,714,311. The estimated receipts from duties on steel railway bars for the fiscal year ending June 30, 1883, as affected by the reductions made by the House bill, as amended by the Finance Committee, are reported at \$1,329,986.

A QUESTION ON LOCOMOTIVE TIRES.

The Treasury Department is in receipt of information of an importation at Chicago of hammered steel forgings, generally known under the commercial designation of "locomotive tires." These are not, however, fitted to go on the wheel. The collector at Chicago levied upon this article a duty of 45 per cent. ad valorem, as a manufacture of steel. The importer, not satisfied with this ruling, appealed to the Department, claiming that the proper duty would be 30 per cent., as steel in form not otherwise provided for. The collector seems to have jumped from the frying pan into the fire, for the officials at the Treasury Department are considering whether the proper duty would not be 3 cents per pound, instead of either of the above rates. The law fixes a duty of 3 cents per pound on locomotive tires. The Secretary of the Treasury has directed information to be asked of the collector at New York as to whether any similar importations had been made at that port, and, if so, how the article was rated. No action will be taken until after hearing from New York. The principle is very similar to that involved in the car-axle controversy, where it was decided that the so-called roll of or hammered iron was an axle. It is therefore not improbable that the ruling in this case will be that the article is to all intents and purposes a locomotive tire, and as such should pay 3 cents per pound.

THE INTERNAL REVENUE AND TARIFF BILL.

The Democratic Senators held a caucus on Monday and determined to insist upon a full and fair discussion of each of the amendments submitted. This would indicate an indefinite prolongation of the debate. It was generally supposed, a few days ago, that the bill would now be in a fair way toward a vote. This extension of the field of debate may last for several weeks, and it may so discourage and disgust the Senators that they may take the first chance to postpone its further consideration until December. This will mean no action at all, for the report of the Tariff Commission and the Appropriation bills will consume all the available time between the first Monday in December and March 4 following. Senator Hale having notified the Senate that further delay would be useless, said that he would antagonize the Tax bill with the Naval Appropriation bill. This will consume a day, at least. Taking everything into consideration things are considerably mixed in the Senate.

THE DISCUSSION OF THE TAX BILL.

The general debate on the bill during the past few days has evolved no new ideas or specially new features. Voorhees made some bold charges that the Republicans had no intention of passing the bill; that it was an afterthought; and that the Republican party would not, at this session, legislate either for revision of the tariff or for revision of the internal revenue tax, and wandered about over the whole field of tariff, excise taxes, bank taxes, the silver question, and then paid his respects to the banks and the stockholders. Apparently not satisfied, he then attacked sugar, touched up perfumery, and finally sat down, to be followed by Mr. Jonas, of Louisiana, who stuck to sugar for a while, and then struck off into Louisiana politics. The discussion for the past few days has been monotonous and unentertaining, being devoted to a rambling controversy respecting the tax on tobacco and sugar.

THE PROSPECTS OF ACTION.

There is every indication that the debate is becoming irksome, and should a motion to table or postpone be made it would have a good chance of being adopted. The Democrats are generally favorable to postponement, but such a motion would need Republican support in order to be successful. The Chairman of the Committee, Mr. Morrill, is not very hopeful himself that the debate can be kept up much longer without a break in some direction. In addition to the solid Democratic vote against it, five or six Republicans have stated that they will vote against the bill in its present shape. These are Lapham, Ingalls, Plumb, Mitchell, Kellogg and perhaps some others. The Republican leaders have thought that the bill would give them some party advantages, but it is doubtful whether they can hold a united vote for it as matters now stand. It is believed that as soon as the Naval, or some other bill, is permitted to intervene, the further consideration of the Tax bill will be postponed until December.

A PLETHORIC TREASURY.

The receipts of the Government for the present month up to the 23d inst. have aggregated: Customs, \$14,000,000; internal revenue, \$9,000,000; and miscellaneous, \$2,500,000, or over \$1,000,000 a day. The disbursements have reached \$15,000,000. With the River and Harbor bill and other schemes of wholesale depredation upon the Treasury, this flattering exhibit will not long be maintained.

Howland's Road Scraper, Grader and Leveler.

It is a fact well known by road makers that a considerable proportion of the cost of repairs is saved by keeping the surface of a roadway in such condition as to facil-



Howland's Road Scraper.

itate drainage. A cheap, rapid and efficient method of attaining this result is said to be furnished by Howland's road scraper, grader and leveler, shown in our engraving, and manufactured by R. S. Dorsey, of Indianapolis, Ind. The scraper, as will be seen, may be readily attached to any wagon and made ready for work in a short time, and is said to work satisfactorily in any place which can be plowed or in which a team can travel. The levy for road taxes may be reduced in a considerable measure by its use, and ridges and ruts effectually removed. Judging from the various advantages claimed for it, the apparatus appears to be highly desirable for trotting tracks and parks. Besides yielding valuable aid in making new roads, streets, &c., it may be successfully employed as a snow plow, easily performing the work of a large number of men. Weeds and grass are rapidly shaved off, and, in short, all operations connected with road making are said to be more easily and cheaply performed by it than can be done by manual labor. Our engraving shows the apparatus in position, ready for work, and it will be seen that it is an extremely simple contrivance, consisting of few parts, durably constructed, and not

liable to get out of order easily. The apparatus has been quite extensively used, and is said to have given excellent results.

An Interesting Patent Case.

A case involving the right of lead smelters to use the method of tapping bullion which is now extensively employed by them, was recently brought before the United States Court at Denver, and resulted in a disagreement of the jury, their vote standing ten to two in favor of the plaintiffs. According to the *Denver Mining Review* the plaintiffs were Messrs. Keyes & Arents, and the defendants the Grant Smelting Co., of Leadville. The subject is of interest and importance to those engaged in the smelting business, as the plaintiffs claim to own and control by letters patent the method alluded to. According to their process a tube having an upward slant and leading from the bottom of the furnace into a suitable basin or lead well, is situated at one side of the furnace and at a convenient elevation. They claim by this means that the molten metal is obtained in a clean state, and that incrustation, or the formation of hard matter upon the side or bottom of the furnace, is avoided. The defendants, on the other hand, claim that there is nothing about the method entitling the plaintiffs to a patent, and hence refused to pay the royalty demanded by them. To prove this, copies of Karsten's Metallurgy were produced in evidence to show that the principle was old and differed only in application from that in use many years ago in Germany and elsewhere. The views shown in the book mentioned show clearly that the defendants were right in their claims, but that instead of a tube leading to a vessel on one side of the furnace and from its bottom, the old method consisted of a simple eye leading from the bottom of the furnace into the bullion sump or well; also, that the slag eye was directly over the fore-heart, allowing the slag to flow into it, if not conveyed away by a slag canal. There can be no doubt that the method of Messrs. Keyes & Arents is a great improvement over the old one, but the question as to whether the new application of an old principle justifies the claim of a patent seemed to be the hinge upon which the trial turned. The endorsement of the patent would result in compelling nearly every smelter in the country to pay a royalty to Messrs. Keyes & Arents, and naturally would bring to those gentlemen a handsome revenue. At present, however, there is nothing definite as to what further steps of a legal kind will be taken in the matter.

LABOR AND WAGES.

The following important circular was issued Saturday:

MINERS' GENERAL OFFICE, PITTSBURGH, PA., July 22, 1882.
To the Locked-Out Miners: In order that, in the transaction of our business, we may have the advantage of secrecy which the operators enjoy, you are hereby advised to turn your organization into assemblies of the Knights of Labor. Arrangements by which your initiation fees can be paid have been completed. The miners of the pits will be organized in succession at 7 p. m. of each evening, as follows: Bell's, Monday, July 24; Candy & Dickson, Tuesday, July 25; Glasshouse and Summerhill, Wednesday, July 26; Bower Hill, Thursday, July 27; Patterson's Slope, Friday, July 28. The remaining pits will be organized during the succeeding week. The Knights of Labor is not an oath-bound organization, and, to the best of my judgment and belief, there is nothing in or about it in conflict with the precepts of good morals and religion, or with the Constitution and laws of the State or nation. For this special purpose the grand officers have granted me a commission as organizer.

D. R. JONES, President.
The threatened lockout of 168 industrial establishments in Rochester, because of a labor combination against one of them, has been arrested by an appeal of business men

ed to 13,293,457 marks. From this it appears that within three years the number of hands had increased by 35,631, being 25.2 per cent., and the aggregate monthly wages by 13,293,457 marks, being an increase of 42 per cent. The average monthly earnings per hand all round amounted, therefore, to 60.92 marks in January, 1879, and to 69.13 marks in January, 1882. The total increase of wages in all the 338 establishments reported on would thus amount in 1882 to 47,000,000 marks, or somewhat over \$11,000,000, as compared with the earnings of 1879. This increase in the aggregate amount is not necessarily tantamount to an increase in the rate of wages, for in 1879 all hands were not fully engaged, while in the year after they all began to work full time again. The 108 joint-stock companies cleared in the financial year 1879, or 1878-79, a net profit of 7,710,198 marks, being 1.9 per cent. of their entire capital, amounting to 398,111,018 marks; in 1881, or in 1880-81, on the contrary, when their share capital had risen to 405,630,918 marks, their net profit, exclusive of depreciation, amounted to 16,342,953 marks. The German protectionists look at the above figures as conclusive in the case of protection vs. free trade.

TRADE PUBLICATIONS.

THE ATLAS ENGINE WORKS.

The Atlas Engine Works, of Indianapolis, Indiana, have favored us with one of their catalogues which, without doubt, is superior both in appearance and arrangement to any previous issue. It is of considerable size, embracing some 330 pages, and contains, in addition to descriptions and illustrations of the engines, boilers, pumps, &c., turned out by the works, tables giving the dimensions of boilers of certain powers, the capacity of tanks and cisterns, standard dimensions of lap-welded American charcoal iron boiler tubes, and much valuable information relating to the care and management of the Atlas engines. The dimensions of the various parts of the engines given in the catalogue are approximately correct for present designs, and the prices, when quoted for engines or boilers, are for ordinary domestic shipment only. The catalogue comprises six divisions, lettered from A to F, the first five parts representing the specialties of the Atlas works, while F represents very little made by them, being compiled largely from the catalogues of other manufacturers. The prices quoted in this part have been furnished by the several manufacturers whose goods are illustrated, and it should be understood that they are subject to the changes of the market without notice. Part A contains engravings and descriptions of portable and semi-portable engines; part B, stationary engines; part C, Atlas Corliss engines; part D, boilers and fittings, and part E, shafting and pulleys.

The catalogue also contains an elevation and ground plan of the shops of the engine works. The shops cover an area of 100,000 square feet, and are equipped with the best modern tools, many of which were made on the spot for the special work required on the Atlas engines and boilers. The works have a capacity for working five hundred men, and as engine and boiler construction alone is prosecuted, some idea may be formed of the magnitude of the establishment. The stock of patterns comprises portable engines, traction engines, slide valve stationary engines, and the Atlas-Corliss engine. Any engine and boiler below 60 horse-power can be furnished at once, or within a very few days, as they are constantly under process of manufacture. The principal parts of larger engines are carried in stock, and engines up to 500 horse power can be furnished in a comparatively short time. All work is made strictly interchangeable, and the establishment is provided with an equipment of special tools and appliances for duplicating the various parts. A great variety of appliances and special mountings for engines and boilers, which are not shown in the catalogue, are manufactured at the shops, and a full line of steam fittings, pumps, injectors, wrought iron pipe, &c., are kept on

hand. These supplies are included in part F, as previously mentioned. It is impossible for us to submit an exhaustive description of the catalogue, the brief space to which we are confined demanding considerable reduction in that respect, but in case any of our readers are anxious for further particulars we would recommend the perusal of the book, copies of which are forwarded on application to the Atlas Engine Works.

Lightning as a Nail Puller.—The Rochester Post-Express tells the following story, which, it is said, is vouched for by the word of a highly respectable gentleman: Some ten days or two weeks ago, as the members of a gentleman's family residing in Rochester were sitting down to the tea-table a thunder storm arose. It wasn't much of a thunder storm, to all appearances, though, and the meal progressed in the ordinary fashion. By and by there was a clap of thunder which was rather louder than usual, accompanied by a very vivid flash of lightning. There was, however, no extraordinary display, and beyond a slight shock, no special effects were felt. But a singular smell pervaded the house, which was at first attributed to

scoping gas. Search was made high and low for the hole in the pipes, but to no effect. Still the smell continued, and upon opening a closet door it appeared stronger than ever, and was accompanied by the perfume of burned leather. Closer inspection showed a pair of boots smoking and shriveled up, from the heel of which all the iron nails had been drawn. "And if it wasn't the lightning that pulled the nails out, what was it?" questioned our informant.

Artificial Ivory.—In making articles of artificial ivory, the greatest difficulty hitherto has been that in order to gain the necessary firmness, a large percentage of the binding substance had to be used, and hence only dull-colored articles could be produced. Recently Mr. J. S. Hyatt, the inventor of Celluloid, has produced a substance in which only very little gum or other cementing material is used, so that, without detriment to its durability, the finished article may still have a pure white color. This result is arrived at by grinding up any suitable matter with a solution of a proper cement. The cement solution is then expressed, the residue is dried and ground, and the powder thus obtained is heated and pressed into molds. The most suitable matter found is oxide of zinc, and the best cement is shellac or some similar vegetable substance. A solution of ammonia forms the solvent. Hyatt first dissolves 8 parts shellac in 32 parts ammonia, sp. gr. 0.995, by thoroughly mixing the two at a temperature of 37½° C. for five hours in a rotating cylinder. Forty parts of oxide of zinc are now mixed by hand into the thin, syrupy solution, and the mixture is well ground on a color mill. The ammonia, having served its purpose, is now driven off by heat, or by exposing the mixture on glass plates for a long time to the air. The residue, consisting merely of dry shellac and zinc oxide, is again finely powdered, and the powder thus obtained is pressed into the molds with a pressure of about 2000 pounds per square inch, and at a temperature of 125° to 137½° C. If the article is to be colored, the coloring matter is either added to the solution before the first grinding, or to the dry mass before the second grinding.

Fischer & Norris, of Trenton, N. J., have issued a circular repudiating certain advertising which appears over their name in a little publication purporting to be a hardware directory. They say their advertisement was obtained by false pretenses, and they have no wish that it should mislead the trade.

MACHINERY For Sale.

Two 15 in. swing, 6 ft. bed, Prentice Lathes. Two 18 in. swing, 6 ft. bed, New Haven Lathes. Above are back geared and screw cutting. One 30 in. Prentice Drill. One 30 in. Prentice Drill, back geared and self feed. One 10 in. Gould & Eberhardt Shaper. One 15 in. Gould & Eberhardt Shaper. One 20 in. Gould & Eberhardt Shaper. One No. 1 Davidson Steam Pump. One 72 in. C. P. L. Bottom. 22 x 12 ft. of 16-0 English R. Ralls, with spikes, in bond. Greenfield Engines, 2½ to 25 horse power. Roots Force Blast Blowers, all sizes. All of above Machinery is entirely new, and can be seen at our warehouses. For further particulars address

COOKE & CO.,
123 (Old No. 6) Cortlandt Street,
NEW YORK CITY.

For Sale.
TO HARDWARE MEN. RARE OPPORTUNITY. Hardware Store. One of the best stands in Pennsylvania. Established over 35 years. Stock very clean, and best reasons given for selling. Address, J. B. Office of *The Iron Age*, 320 So. 4th St., Phila.

Wanted.
In a Retail Hardware Store. A young man acquainted with the business. Address, giving reference and stating salary expected, P. O. Box 593, New Haven, Conn.

ROLL TURNER.
A thoroughly practical roll turner on guide iron and shape iron can obtain a good and steady job by applying to
UNION FOUNDRY & MACHINE CO.,
CATASAUQUA, Pa.

Wanted.
A THOROUGHLY COMPETENT MAN, To contract for the Scrap Piling, Heating and Bolding of Bilets. Try in now running. Address, with references, &c., J. A. M., Office of *The Iron Age*, 83 Reade St., New York.

Wanted.
A competent person to take charge of a small Brass Mill; also, one finishing Roller in brass, and one Fine Wire Drawer. To persons competent, and of good character, liberal wages will be paid and a permanent position furnished. Address
BRASS MILL,
Office of *The Iron Age*, 83 Reade St., New York.

Wanted.
A Salesman visiting the Jobbing, Hardware, and similar trades, would like to add
A STABLE SPECIALTY.
Either on commission or salary. Address, A. B. C., Office of *The Iron Age*, 83 Reade St., New York.

Wanted.
A young man with 15 years' business experience in office and as commercial traveler, desires a position with first-class house. References. Address
C. M. WILDE,
Care of 173 Jay St., Albany, N. Y.

Wanted.
A position as builder of rolling mills, or to remodel them. Will furnish drawings for either. Has built and operated seven mills North and three South. Spent last year North getting posted in all matters pertaining to mills to date. Address, P. O. Box 115, Chattanooga, Tenn.

Special Notices. Furnace Property For Sale.

Will be sold at a low price. The Charter, Rights and Real Estate of the Bloomsburg Iron Co., together with such portions of the stock of materials and other personal property as purchasers may require. The real estate consists of two blast furnaces favorably known as the Ironstone Furnaces, in good condition, steam engine, water power of 100 to 200 horse power, lands with extensive iron mines, storehouse, numerous dwelling houses, R. R. tracks and sidings several miles in length (connecting the furnaces with both Canal and Railroad), canal wharves with tracks and facilities for receiving and shipping large quantities of freight with economy and dispatch, either by canal or railroad. This property is situated at Bloomsburg, Pa., within 10 miles of the Wyoming Coal field. The furnaces have been in continuous and successful use for 37 years. The Company own in addition extensive and valuable ore mines in Snyder Co., Pa. All the property is in good order and now in profitable use. For further information apply to
CHAS. R. FAYTON, President,
Bloomsburg, Pa.

For Sale.
THE BARREL, KEG AND BOX FACTORY, with Latest Improved Machinery, Buildings, and about three-fifths of an acre of ground, with Railroad and River Privileges direct to factory; situated in the most valuable part of Chattanooga. Or an interest would be sold to the right parties, who would take personal charge of it. For particulars inquire of C. W. GRAY & CO., Grayville, Ga., or S. B. LOWE, Chattanooga, Tenn.

For Sale.
A GOOD MUCK BAR AND SCRAP SHEAR, - For \$310. Address
CRAIG RIDGWAY & SON, Coatesville, Pa.

For Sale.
One 45-ft. and one 30 ft. SELLERS' CAST-IRON TURN TABLE. In good order. For particulars apply to
PURCHASING AGENT,
PENNA RAILROAD CO., Philadelphia.

For Sale.
Two new 24-inch Upright Drills, weight 1600 lbs., quick return; balance spindle; latest design; price \$200. One 6-inch Upright Drill, same design, only \$100. One Planer, just completed, 11th Worcester street; 18 in. diameter; length of bed 6½ ft.; table 6 ft.; planes 18 in. x 1½ in. high; weight 1200 lbs.; one of the most complete running and sufficient pieces made; price \$750.
S. M. YORK,
Cleveland, Ohio.

Corliss Engines For Sale.

PROMPT DELIVERY.
One 12-inch cylinder, 36-inch stroke, at once. One 24-inch cylinder, 36-inch stroke, in two weeks. Apply to
THE GEORGE PLACE MACHINERY CO.,
121 Chambers and 123 Reade St., New York.
BALTIMORE, JULY 11, 1882.
THE FIRM OF CARLIN & FULTON IS THIS DAY DISSOLVED BY THE DEATH OF THE LATE JAMES F. CARLIN.
J. FRANK BRADENBAUGH,
GEORGE L. IRVIN.

BALTIMORE, JULY 19, 1882.
The undersigned, having formed a Copartnership and purchased the good will and assets of the late firm of Carlin & Fulton, assuming the liabilities of the same, will continue the HARDWARE BUSINESS under the same firm name and at the same place as heretofore.
GEORGE L. IRVIN,
FRANK WHALEN,
MARTIN J. CARLIN,
MARY E. FULTON.

Wanted.
TO RENT,
A Foundry for Hollow Ware, Stoves and Light Castings. Philadelphia preferred. Also a well located Charcoal Furnace. Address, C. S. A., Hackensack, N. J.

Cutlery Salesmen Wanted.
By a manufacturing and importing cutlery house in this city. To those who can control a trade among retailers liberal terms will be given. Address, X. Y. Z., Office of *The Iron Age*, 83 Reade St., New York.

A Firm of Metal Agents
desire to communicate with American manufacturers of specialties for mines, railways, agricultural and building trades, with a view to representing them in London.
Address, METALS,
11 Queen Victoria Street,
London E. C., England.

Sheet Iron.
300 tons No. 22 to 28 for immediate delivery. 200 tons to be made to order on very short notice. Write for prices to
PACKARD, SMITH & CO.,
Warren, Ohio.

A MECHANIC AND ENGINEER wishes an engagement to lay out or superintend work for responsible parties. Address, A. B. Box 9, Office of *The Iron Age*, 83 Reade St., New York.

Situation Wanted.
A young man with 15 years' business experience in office and as commercial traveler, desires a position with first-class house. References. Address
C. M. WILDE,
Care of 173 Jay St., Albany, N. Y.

Wanted.
A position as builder of rolling mills, or to remodel them. Will furnish drawings for either. Has built and operated seven mills North and three South. Spent last year North getting posted in all matters pertaining to mills to date. Address, P. O. Box 115, Chattanooga, Tenn.

Special Notices. E. BISSELL & CO., Wholesale Auctioneers.

LARGE TRADE SALE OF
Hardware, Table and Pocket Cutlery.
ON
TUESDAY, WEDNESDAY AND THURSDAY,
August 8th, 9th and 10th.
At 83 CHAMBERS and 65 READE Sts., New York.

TUESDAY, Aug. 8th.—The sale will comprise a general assortment of Hardware; also, 1000 doz. Files, 500 doz. Drawers, Tins and Padlocks, 500 doz. Hammers and Hatchets, 600 doz. Sash Brushes, 100 doz. Steel Shovels and Spades, 500 doz. Hand and Panel Saws, 500 doz. Campbell & Johnson Files, 100 cases extra quality Cut Tacks, full ½ weight, all sizes; 100 Reams Sand Paper; together with other goods too numerous to mention.

WEDNESDAY and THURSDAY, Aug. 9th and 10th.—SPECIAL SALE of Table Cutlery, Carvers, Butcher Knives, Seconds, comprising over 12,000 doz. Table Knives and Forks, desirable patterns, in ebony, bone and cocco; 2000 doz. Table Knives in ivory, rubber, ebony, ivory, cocco and bone; 1000 pair Carvers, desirable patterns; several hundred doz. Plated Tea and Table Spoons and Forks, standard plate on 18 per cent. nickel silver, and goods that we can warrant of superior quality; several hundred doz. Plated Steel Table, Medium and Desert Knives, 12, 13 and 16 oz. plate; also a large line of Butcher Knives, Bread and Kitchen Knives, Walnut Carving Knives, &c., &c.; 500 doz. 18 per cent. nickel silver Tea and Table Spoons and Forks, not plated; 200 doz. Britannia Tea and Table Spoons; also 1000 doz. cast-steel, Japanese and nickel plated Straight Trimmers, Tailors' and Barbers' Shears; large line of American and Foreign Pocket Cutlery, in 1, 2, 3 and 4 blades, &c., &c. Buyers who cannot attend the sale can forward their orders, and goods will be purchased free of charge.

Hardware Business For Sale
In Western New York.
Stock of hardware, stores, tinware, etc., in elegant brick store; three new railroads now building, and trade rapidly growing. A good party wishing a fine business will do well to investigate. Address, W. W. Box 8, Office of *The Iron Age*, 83 Reade St., N. Y.

IRON AND METAL
Exchange Memberships
Bought and Sold by
WM. WILLIS MERRILL,
4 Stone Street, Room 69.
Dealer in
EXCHANGE MEMBERSHIPS.

The Sherman Process Co.
9 Pemberton Square, Boston, Mass.,
Issue Licenses to use the Process for the
Manufacture of Iron and Steel
In the Bessemer Converter, Crucible, Siemens Martin, Puddling, Blast and Cupola Furnaces. The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working. See page 17 of *The Iron Age* of Oct. 25th, 1877.

Wanted.
A Scrap Heater and Roucher on 16-inch train; also Scrap Pliers. Those having references may apply to
A. R. WHITNEY & CO.,
58 Hudson St.,
New York City.

Wanted.
A Coffee Mill Squeezer
In good working order. Address,
PENN IRON CO., LIMITED,
LANCASTER, Pa.

Export.
An American of middle age, with a long business experience in foreign countries, is making up a voyage to the East Indies, Australia, New Zealand and Cape Colonies, Africa, and will take a sample line of American hardware, machinery and specialties, if a sufficient number of responsible houses apply. Solid references given. Address,
TRAVELER,
P. O. Box 452, New Haven, Conn.

To Hardware Men—Rare Opportunity.
The undersigned, having determined, on account of ill health, to retire from business, offers for sale, on very advantageous terms, his well known and profitable hardware business, including the good will of the business, situated in the James D. Hill block, 202 Water Street, New York City. This is an opportunity rarely presented, and the business having been established over 30 years, and would be offered for the reasons above set forth. Address,
WM. GILL,
New York City.

WANTED.—A situation as Superintendent or Manager of Blast Furnace or Ore Mine. Either Hot or Cold Blast Charcoal or Coke. Eleven years' experience. Best of references. Address, **MANAGER, Box 7,** Office of *The Iron Age*, 83 Reade St., New York.

WANTED. A position as general Mechanical Manager, by a man experienced in all the details of stationary, portable and marine engine and boiler work, pattern making and foundry work, also experienced in designing and drafting all kinds of new machinery and estimating the cost and price, and in the systematic and economical management of help. Unquestionable reference offered. Address, C. D., 57 East 6th Street, Oswego, N. Y.

PUNCHING PRESS AND SHEARS FOR SALE.—New Roller Machine, 24 inch throat. Punches 3-4 hole in 3-4 iron. Also Power Press, cutting 2-4 punch-iron, 27 or 31 inch throat. Also larger sizes single and combined. **PERKINS PUNCH AND SHEAR CO.,** 38 W. Dey Street, New York.

WANTED.—A position by a thorough Hardware Salesman and Bookkeeper, either in the house or traveling, on commission or salary. Can furnish unquestionable reference. Address, P. O. Box 2440, St. Louis, Mo.

TO MANUFACTURERS.—A gentleman who has an office in New York, is desirous of representing goods suitably for the Hardware and House Furnishing Goods Trade. Address, MANUFACTURERS' AGENT, Office of *The Iron Age*, 83 Reade St., New York.

Special Notices. NEW IRON WORKING MACHINERY.

ENGINE LATHES.
38 in. triple gear 4 bed to suit. Pittsburgh. 28 in. swing, 18 foot bed. Pittsburgh. 28 in. swing, 18 foot bed. Pittsburgh. 24 in. swing, 14 and 16 foot bed. Pittsburgh. 24 in. swing, 12 and 14 foot bed. Pittsburgh. 20 in. swing, 14 foot bed. Pittsburgh. 20 in. swing, 12 foot bed. Pittsburgh. 18 in. swing, 10 and 12 foot bed. Pittsburgh. 18 in. swing, 10 and 12 foot bed. Pittsburgh. 16 in. swing, 8 foot bed. Pittsburgh. 16 in. swing, 6 and 8 foot bed. Pittsburgh. 16 in. swing, 6 and 8 foot bed. Pittsburgh.

PLANERS, SHAPERS & SLOTTERS.
36 in. x 36 in. x 9 foot Planer (all hand; good order). 30 in. x 30 in. x 8 foot Planer. It was & Phillips. 26 in. x 24 in. x 6 and 7 foot Planer. Wheeler. 24 in. x 24 in. x 8 foot Planer. Filibing. 22 in. x 20 in. x 4 ft. 6 Planer. 17 in. x 14 in. stroke Shaper. Gould & Eberhardt. 16 in. stroke Shaper. Gould & Eberhardt. 16 in. stroke Shaper. Gould & Eberhardt. 12 in. Slotter (swi. 6 in.) Hewes & Phillips.

DRIILL PRESSES.
60 in. Radial Drill double geared self-feed, planed and slotted bed plate with portable table; be English make (Tag. 21). weight 1 tons. 48 in. Radial Drill, double geared, self feed, slotted and planed bed. Bette. 30 in. back gear red antifriction. P. entice. 25 in. back gear self feed. F. o. burg. 25 in. quick return. Blaisdell. 18 in. quick return. Blaisdell. 18 in. quick return. Blaisdell. 2, 3 and 4 spindle return. Garvin. 15 in. swing 5 ft. 6 in. 10 in. stroke. Gage. No. 2 (4 x 15) Bolt Cutters. Merriman's. 10 in. Hand and Millers. Garvin. These tools are on hand and for quick delivery.

KELLY & LUDWIG.
49 & 51 N. 7th St., Philadelphia, Pa.

For Sale. Palo Alto Rolling Mills, Near Pottsville, Pa., ON THE MAIN LINE OF THE POTTSVILLE AND READING RAILROAD.

These mills are in good repair, and can be started at any time. Rolls for T-Hulls 12 to 20 lbs. per yard, and for Street Halls 18 to 20 lbs. per yard. Guide Mill Train for Merchant Iron ¾ x 1 inch. Rolls for Merchant Bar, round and square, up to 4½ inches. Number of Puddling Furnaces in both mills, 37; Heating Furnaces, 9; all with boilers attached. Also a machinery shop, blacksmith shop, iron house, roll house, pattern shop and pattern shop, stables, handsome dwelling for Superintendent, 21 Tenant Houses, a Brick Office, and ample grounds for stock and cinder. For further particulars address

Messrs. LEE & McCAMANT, Exrs.,
Pottsville, Pa.
THOS. F. WRIGHT, 1834 Race St., Philadelphia, Pa.
HUGH W. ADAMS, 56 Pine St., New York.

For Sale.
9 in. Merchant Mill, 36 Rolls. 18 in. Merchant Mill, 6 ft. Rolls. The Hammer for Blooms. 2 48 in. Reynolds Turbines. Lever Shears, Can motion. Crocker Squeezer. Heavy Roll Lathe, with small auxiliary Lathe. 14 in. x 14 in. Vertical Engine in Perfect Order. A. G. BROOKS & WINEBRENER, 26 N. 3d St., Philadelphia.

For Sale.
A New York Steam Engine Co. Radial Drill; new and first-class in every respect; will drill to the center of 7 feet. Send for description. **JOSEPH LUMLEY,** 144 N. 3d St., Philadelphia, Pa.

For Sale.
A Noiseless Vertical Engine, 8 x 8 Cylinder. New. 1 Vertical Engine, 8 x 8 Cylinder. Second Hand. 1 30 in. P. Vertical Tubular Boiler; cast-iron base plate; all complete; in good order. Second Hand. 1 11 H. P. Vertical Tubular Boiler; cast-iron base plate; all complete; in good order. Second Hand. F. B. BANNAN, STEAM HEATING AND BRASS WORKING, Pottsville, Schuylkill Co., Pa.

For Sale.
A Merchant Bar Rolling Mill, in perfect running order, now working; located on one of the principal Railroads in the eastern portion of the State of Pennsylvania. For full particulars address
BARE CHANCE,
Office of *The Iron Age*, 320 So. 4th St., Phila., Pa.

For Sale.
One of the largest Hollow Ware and Store Foundries in the city of Philadelphia, which has been in operation for the last 35 years—one of the partners having recently died, and the remaining partner being desirous of getting out of business. All communications that mean business will receive prompt attention. Address
"B. C." Office of *The Iron Age*, 83 Reade St., New York.

Machinery For Sale. (ALL NEW).
One 20 in. Power Drill Press. Three 20 in. Davis Power Drill Presses. One 20 in. Hand Blacksmith Drill. Three Gear Cutting Attachments for Lathes. Twelve Assorted Chucks, 4 in. to 18 in. One Bolt Cutter, 14 in. to 18 in. Three Barbed Lathes. Six Hand Shearing and Punching Machines. Two Sturtevant Blowers. Also, one second-hand Horizontal Engine, 12 x 24. One second-hand Horizontal Engine 10 x 16. 16 and 18 S. Howard & S., Baltimore.

Shears For Sale.
POWER SHEARS for cutting Bar and Scrap Iron, 6 in. x ½ in., 8 in. x ½ in., and 1½ round or square, "Alligator" style, new. Net price, \$510. Immediate delivery.
PEERLESS PUNCH AND SHEAR CO.,
38 W. Dey St., New York.

For Sale.
MACHINES AND RIGHTS
For making Solid Punched Axes, Picks, Mat: tools, Hammers, with Dies Complete. Address, T. & CO., Box 25, Office of *The Iron Age*, 83 Reade St., New York.

Wanted.
A Partner with \$5000 to \$10,000 in a Foundry and Machine Business, established in 1844. For particulars, inquire of
I. H. COLLIER,
Poughkeepsie, N. Y.

Special Notices. ROBERT R. HAYDOCK & CO., AUCTIONEERS,

No. 75 Murray Street, New York,
SOLE AGENTS FOR
HARDWARE, CUTLERY, &c.
FOR SALE OR TO RENT.

New, light Factory; 70,000 floor feet; 975 H. P. Corliss Engine, giving power at minimum cost. Shafting, piping, elevator, &c., all complete and modern. Lowest insurance rates. Railroad siding and ample yard room. Immediate possession. A large quantity of General and Special Machinery at low prices.

SHARPE RIFLE COMPANY,
Bridgeport, Conn.

Manufacturing Property for Sale.
The Real Estate of the late Foundry and Machine Company of Taunton, Mass. Building a complete of Foundry, Machine, Erecting and Blacksmith Shop, and covering about 50,000 square feet of ground, and covered by rail to N. Y. For particulars apply to
THE GEORGE PLACE MACHINERY AGENCY,
121 Chambers St., New York.

DESIRABLE FACTORY PROPERTY For Sale.

Being the Mills formerly occupied by Slade Woolen Co., Ansonia, Conn. The buildings consist of the Main Mill 16 x 30 feet, 4 stories; and 3 outbuildings, as follows: One 50 x 100, 1 story. Brick. One 50 x 100, 3 stories. Brick. One 25 x 12, 3 stories. Stone. Also Barn and one Double Tenement on property. 80 H. P. Engine, Harris-Corliss make. 180 H. P. Boilers, with shafting, pulleys, &c. The lot, about 2 acres, is on R. F. track, well situated near Depot and P. O.; 3 lines for freight to N. Y.; only 2½ hours by rail to N. Y. For further particulars address
CHAS. L. HILL,
Ansonia, Conn.

For Sale.
The Industrial Works of Shamokin, owned and successfully carried on for a number of years by the late Wm. Brown, deceased, consisting of Foundry and Machine Shop, and a large stock of Pattern regarded as parts of the property. Boiler Shop, Blacksmith Shop and Factory for the manufacture of heavy coal screws. Well located in the borough of Shamokin, Pa., with the best facilities for shipping by rail, and surrounded by a district contributing all the work that a shop of that kind can possibly turn out. The works are now running, but in a very short time possession can be given. Easy terms of payment are offered to suit a purchaser of limited capital. Offered for sale by
WM. McILVAIN & SONS,
Reading, Pa.

DESIRABLE MANUFACTURING SITE For Sale or Rent.

Being the extensive property formerly occupied by the
BUFFALO IRON AND NAIL WORKS AT BLACK ROCK, IN THIS CITY.
The buildings cover over three acres, and are of brick and wood, substantially constructed, and with slate roofs. They could easily be changed, if necessary, to suit almost any kind of business. Water and railroad communication to all parts of the country. Maps of the property, with full description, sent on application.
F. P. PRATT or F. L. PRATT,
Buffalo, N. Y.

For Sale.
Second-hand
DROPS AND LIFTERS.
BEECHER & PECK,
Lock Box 122, New Haven, Conn.

For Sale.
Horizontal Engines, 16 x 42 (Howes & Phillips), with cut-off; 16 x 36 (Currier), with cut-off; 16 x 28 Upright Engine, with cut-off; one 80 H. P. Locomotive Boiler; one 4-ton "O" Old Freight Elevator; one 50 H. P. Horizontal Tubular Boiler. All the above guaranteed complete and in perfect order. For particulars address
BELCHER & BAGNALL,
40 Cortlandt St., N. Y.

For Sale.
One pair good, sound CHILLED ROLLS, 35 in. x 60 in., made by A. Garrison & Co., Pittsburgh. No use for them. One 40 in. HEATER, 18 in. x 60 in., with 11 inch tubes. Been used some. Will sell cheap.
CHAS. FUSTON & SONS,
Coatesville, Chester County, Pa.

For Sale.
Two Corliss Condensing Beam Engines, 32 in. x 72 in. cylinders. Address,
THE HARTFORD ENGINEERING CO.,
Hartford, Conn.

FOR SALE.
One Horizontal Engine, 16 in. x 42 in. One Horizontal Engine, 24 in. x 60 in. One "Corliss" Horizontal Engine, 18 in. x 42 in. Two Horizontal Engines, 20 in. x 60 in. Two Horizontal Engines, 20 in. x 30 in. Two Locomotive Engines, 18 in. x 40 in. One Upright Engine, 28 in. x 30 in. Boilers, Flues and Bed Plate suitable for 18 in. train. 264 and 266 Water Street.

FOR SALE OR FOR RENT.
A complete Rolling Mill and Blast Furnace, favorably located, with easy access to Pennsylvania Railroad and to Philadelphia and Reading Railroad. For further particulars, address,
P. O. BOX 545,
Harrisburg, Pa.

DRIILL PRESS FOR SALE.—New Upright Power Drill Press, swings 11 inches, back geared, quick return motion, steel spindle and shaft, superior finish; weight, 1100 lbs.; height, 5 feet; price, \$2100. **PERKINS PUNCH CO.,** 38 W. Dey St., New York.

EXPORTS

Of Hardware, Iron, Machinery, Metals,
&c., from the Port of New York, for the
Week ending July 25, 1882:

Dutch West Indies	Quan.	Val.	Dutch West Indies	Quan.	Val.
Pt. M., gals., 1610	1610	\$170	Pt. M., gals., 1610	1610	\$170
Cutlery, case	1	50	Cutlery, case	1	50
Saw, ma., cs.	10	20	Saw, ma., cs.	10	20
Danish West Indies			Danish West Indies		
Pt. M., gals., 2370	2370	263	Pt. M., gals., 2370	2370	263
Hamburg			Hamburg		
Pt. M., gals., 1,655,480	1,655,480	126,115	Pt. M., gals., 1,655,480	1,655,480	126,115
Nails, cs.	1	61	Nails, cs.	1	61
Mach'y, pkgs.	180	9,900	Mach'y, pkgs.	180	9,900
Bells, cs.	1	35	Bells, cs.	1	35
Rifles, cs.	1	100	Rifles, cs.	1	100
Hdw., pkgs.	48	1,165	Hdw., pkgs.	48	1,165
Arms, case	1	216	Arms, case	1	216
Saw, ma., cs.	647	10,425	Saw, ma., cs.	647	10,425
Mt. g'ds, cs.	4	100	Mt. g'ds, cs.	4	100
Bremen			Bremen		
Hdw., pkgs.	7	225	Hdw., pkgs.	7	225
Mach'y, case	1	125	Mach'y, case	1	125
Tin plates, cs.	50	50	Tin plates, cs.	50	50
Pt. M., gals., 759,150	759,150	45,771	Pt. M., gals., 759,150	759,150	45,771
Ag. imp., pgs.	212	4,500	Ag. imp., pgs.	212	4,500
Pt. M., gals., 384,700	384,700	26,920	Pt. M., gals., 384,700	384,700	26,920
Elisavere			Elisavere		
Pt. M., gals., 182,600	182,600	13,300	Pt. M., gals., 182,600	182,600	13,300
Flensburg			Flensburg		
Pt. M., gals., 136,773	136,773	9,700	Pt. M., gals., 136,773	136,773	9,700
Rosstock			Rosstock		
Pt. M., gals., 145,536	145,536	11,910	Pt. M., gals., 145,536	145,536	11,910
Antwerp			Antwerp		
Pt. M., gals., 1,047,636	1,047,636	144,201	Pt. M., gals., 1,047,636	1,047,636	144,201
Saw, ma., cs.	192	4,965	Saw, ma., cs.	192	4,965
Mach'y, pgs.	12	384	Mach'y, pgs.	12	384
Guns, cs.	200	2,520	Guns, cs.	200	2,520
Ore, tons	213	1,650	Ore, tons	213	1,650
Hdw., cs.	14	246	Hdw., cs.	14	246
Pumps, pkgs.	1	558	Pumps, pkgs.	1	558
Rotterdam			Rotterdam		
Pt. M., gals., 381,150	381,150	20,000	Pt. M., gals., 381,150	381,150	20,000
Iron safe	1	143	Iron safe	1	143
Mach'y, pkgs.	4	70	Mach'y, pkgs.	4	70
Mach'y, pgs.	56	1,150	Mach'y, pgs.	56	1,150
Ag. imp., pgs.	1	100	Ag. imp., pgs.	1	100
Saws, cs.	1	50	Saws, cs.	1	50
Hdw., pkgs.	9	145	Hdw., pkgs.	9	145
Clocks, pkgs.	1	125	Clocks, pkgs.	1	125
Mf. iron, pgs.	4	125	Mf. iron, pgs.	4	125
Chains, pkgs.	7	351	Chains, pkgs.	7	351
Amsterdam			Amsterdam		
Pt. M., gals., 325,390	325,390	16,940	Pt. M., gals., 325,390	325,390	16,940
Mach'y, pkgs.	6	2,000	Mach'y, pkgs.	6	2,000
Dutch East Indies			Dutch East Indies		
Pt. M., gals., 201,000	201,000	21,600	Pt. M., gals., 201,000	201,000	21,600
Ceylon			Ceylon		
Pt. M., gals., 300,432	300,432	7,000	Pt. M., gals., 300,432	300,432	7,000
Danitz			Danitz		
Pt. M., gals., 426,982	426,982	35,123	Pt. M., gals., 426,982	426,982	35,123
Arendal			Arendal		
Pt. M., gals., 317,017	317,017	21,913	Pt. M., gals., 317,017	317,017	21,913
Stettin			Stettin		
Pt. M., gals., 334,814	334,814	41,148	Pt. M., gals., 334,814	334,814	41,148
Konigsberg			Konigsberg		
Pt. M., gals., 310,274	310,274	15,066	Pt. M., gals., 310,274	310,274	15,066
Christiana			Christiana		
Pt. M., gals., 156,060	156,060	12,995	Pt. M., gals., 156,060	156,060	12,995
Bristol			Bristol		
Clocks, bxs.	56	501	Clocks, bxs.	56	501
Pt. M., gals., 192,550	192,550	18,388	Pt. M., gals., 192,550	192,550	18,388
Hull			Hull		
Clocks, pkgs.	4	50	Clocks, pkgs.	4	50
Hdw., cs.	31	319	Hdw., cs.	31	319
Liverpool			Liverpool		
Ag. imp., pgs.	75	9,420	Ag. imp., pgs.	75	9,420
Pt. M., gals., 381,150	381,150	20,000	Pt. M., gals., 381,150	381,150	20,000
Hdw., pkgs.	9	145	Hdw., pkgs.	9	145
Rifles, cs.	1	100	Rifles, cs.	1	100
Clocks, bxs.	147	4,743	Clocks, bxs.	147	4,743
Cutlery, pgs.	2	1,660	Cutlery, pgs.	2	1,660
Mach'y, pkgs.	108	5,305	Mach'y, pkgs.	108	5,305
Saw, ma., cs.	993	15,938	Saw, ma., cs.	993	15,938
Ore, sacks	207	1,600	Ore, sacks	207	1,600
Newcastle			Newcastle		
Pt. M., gals., 110,352	110,352	9,000	Pt. M., gals., 110,352	110,352	9,000
London			London		
Mf. iron, pgs.	6	204	Mf. iron, pgs.	6	204
Hdw., pkgs.	302	10,648	Hdw., pkgs.	302	10,648
Mach'y, pkgs.	38	2,520	Mach'y, pkgs.	38	2,520
Nails, cs.	4	230	Nails, cs.	4	230
Saw, ma., cs.	2,430	50,720	Saw, ma., cs.	2,430	50,720
Clocks, bxs.	70	2,068	Clocks, bxs.	70	2,068
Pt. M., gals., 14,300	14,300	1,860	Pt. M., gals., 14,300	14,300	1,860
Iron pipes	627	9,910	Iron pipes	627	9,910
Fiba, ma, cs.	42	408	Fiba, ma, cs.	42	408
Stigo			Stigo		
Pt. M., gals., 137,500	137,500	10,000	Pt. M., gals., 137,500	137,500	10,000
Canada			Canada		
Tin plates, bxs.	39	149	Tin plates, bxs.	39	149
Mach'y, pkgs.	1	50	Mach'y, pkgs.	1	50
Guaymas			Guaymas		
Ag. imp., pgs.	91	3,300	Ag. imp., pgs.	91	3,300
Saw, ma., cs.	14	1,031	Saw, ma., cs.	14	1,031
Arms, cs.	6	462	Arms, cs.	6	462
Saws, bxs.	1	178	Saws, bxs.	1	178
Mach'y, pkgs.	3	38	Mach'y, pkgs.	3	38
Hdw., pkgs.	34	372	Hdw., pkgs.	34	372
Mf. iron, pgs.	135	1,500	Mf. iron, pgs.	135	1,500
Wringers, cs.	3	72	Wringers, cs.	3	72
British Guiana			British Guiana		
Pt. M., gals., 7,000	7,000	840	Pt. M., gals., 7,000	7,000	840
Hdw., cs.	39	744	Hdw., cs.	39	744
Ag. imp., pgs.	11	11	Ag. imp., pgs.	11	11
Mf. iron, pgs.	1	24	Mf. iron, pgs.	1	24
Saw, ma., cs.	34	315	Saw, ma., cs.	34	315
Havre			Havre		
Nails, bxs.	65	524	Nails, bxs.	65	524
Pt. M., gals., 275,149	275,149	23,340	Pt. M., gals., 275,149	275,149	23,340
Tacks, bxs.	28	300	Tacks, bxs.	28	300
Hdw., cs.	9	204	Hdw., cs.	9	204
Ag. imp., pgs.	23	1,325	Ag. imp., pgs.	23	1,325
British West Indies			British West Indies		
Mf. iron, pgs.	45	491	Mf. iron, pgs.	45	491
Y. metal, cs.	1	55	Y. metal, cs.	1	55
Nails, kegs.	45	245	Nails, kegs.	45	245
Cutlery, cs.	1	100	Cutlery, cs.	1	100
Pt. M., gals., 17,254	17,254	8,270	Pt. M., gals., 17,254	17,254	8,270
W. mls, cs.	4	115	W. mls, cs.	4	115
Hdw., pkgs.	20	391	Hdw., pkgs.	20	391
Ag. imp., pgs.	5	50	Ag. imp., pgs.	5	50
Saw, ma., cs.	3	70	Saw, ma., cs.	3	70
Clocks, pkgs.	1	13	Clocks, pkgs.	1	13
Mf. iron, pgs.	109	1,807	Mf. iron, pgs.	109	1,807
Scales, pkgs.	389	9,311	Scales, pkgs.	389	9,311
Ag. imp., pgs.	282	5,280	Ag. imp., pgs.	282	5,280
Nails, kegs.	390	1,450	Nails, kegs.	390	1,450
Saw, ma., cs.	1	185	Saw, ma., cs.	1	185
Arms, cs.	2	110	Arms, cs.	2	110
Cette			Cette		
Pt. M., gals., 350,028	350,028	24,745	Pt. M., gals., 350,028	350,028	24,745
Bordeaux			Bordeaux		
Pt. M., gals., 73,880	73,880	5,880	Pt. M., gals., 73,880	73,880	5,880
Napoli, gals., 44,758	44,758	2,650	Napoli, gals., 44,758	44,758	2,650
British Australia			British Australia		
Hdw., pkgs.	955	14,167	Hdw., pkgs.	955	14,167
Mf. iron, pgs.	59	214	Mf. iron, pgs.	59	214
Clocks, pkgs.	296	5,849	Clocks, pkgs.	296	5,849

CHINA.	Quan.	Val.	CHINA.	Quan.	Val.
Spikes, cs.	150	860	Spikes, cs.	150	860
Mf. iron, pgs.	111	985	Mf. iron, pgs.	111	985
Ag. imp., pgs.	87	1,074	Ag. imp., pgs.	87	1,074
Saw, ma., cs.	40	1,074	Saw, ma., cs.	40	1,074
M. h. l., cs.	29	1,310	M. h. l., cs.	29	1,310
Mach'y, pkgs.	4	410	Mach'y, pkgs.	4	410
Pt. M., gals., 15,200	15,200	1,148	Pt. M., gals., 15,200	15,200	1,148
Nails, kegs.	605	2,140	Nails, kegs.	605	2,140
Locomotive	1	4,725	Locomotive	1	4,725
Hdw., pkgs.	151	3,595	Hdw., pkgs.	151	3,595
Scales, bxs.	87	480	Scales, bxs.	87	480
Clocks, pgs.	1	50	Clocks, pgs.	1	50
Arms, cs.	2	150	Arms, cs.	2	150

COAL.

In the Anthracite trade a good fair business is in progress, made up very largely of business on old orders; that is to say, when the product of the mines was much restricted, say two months ago, many consumers became apprehensive of a shortened supply, and sent in orders ahead for future delivery. These constitute the bulk of present business, as just remarked, though it is possible that July prices are sometimes realized. On account of this condition, prices are weak, but the dull season is passing away without complaint. The talk about an advance of prices in August may be only for effect. In any case, the companies will be in no haste to declare their intentions. Lehigh Coal is still quoted \$5.25 for Lump, and \$4.25 @ \$4.50; for other sizes about \$3.80 @ \$4.10.

Bituminous Coal is quiet at \$4.50 @ \$4.75 f. o. b., and of most kinds in fair supply. American freights are \$1.10 to Boston and 90¢ to Providence. Vessels scarce this side of the Cape.

The total tonnage of Anthracite Coal from all the regions for the week ending July 15, as reported by the several carrying companies, amounted to 693,934 tons, against 649,883 tons in the corresponding week last year. The total amount of Anthracite mined for the year is 13,970,871 tons, against 13,548,929 tons for the same period last year. The quantity of Bituminous Coal sent to market for the week amounted to 55,171 tons, against 103,632 tons in corresponding week last year, a decrease of 48,461 tons.

OLD METALS, PAPER STOCK, &c.

The purchasing prices offered by dealers are as follows:

Copper, heavy	100	\$0.155
Light	100	0.14
Copper Bottoms	100	0.135
Yellow Metal	100	0.10
Brass, heavy	100	0.115
Brass, light	100	0.10
Composition, heavy	100	0.155
Lead, heavy	100	0.045
Tea Lead	100	0.04
Zinc	100	0.35
Pewter, No. 1	100	0.15
Pewter, No. 2	100	0.14
Wrought Iron	100	24.00
Light do.	100	13.00
Stove Plate	100	18.00
Machinery do.	100	15.00
Grate Bars	100	5.00
Electrotype plates	100	0.04
Stereotype plates	100	0.05
Small type	100	0.05

PHILADELPHIA.

Office of The Iron Age, 220 South Fourth st., PHILADELPHIA, July 25, 1882.

The general condition of the market is unchanged since our last, and no immediate change is looked for. The hot weather is decidedly unfavorable to anything bordering on activity in business circles, and quietness may be regarded as a leading feature of the past week's market. Regarding the future there is a very hopeful feeling, and the general impression is that in the course of a few weeks business will become more active, and that the market during the fall and winter will be active and firm; in anticipation of which the present slowness is borne with some degree of equanimity. Sellers, as a rule, are not forcing sales, and buyers are still inclined to hold on to their conservative policy, and buy in small lots. While no heavy transactions are reported, a good business, however, in small lots has been effected. Supply is about equal to demand, except perhaps in the better brands of Pig Iron, and prices are steady and unchanged.

Pig Iron is without any material change. The demand appears to be increasing, and the aggregate of orders placed during the week makes a considerable sum. Standard brands of Foundry Irons are scarce and prices have a slight upward tendency; quotations, however, are unchanged. No. 2 Foundry is in more plentiful supply, but prices show slight weakness, and inquiry is rather slow. Forge Irons are in active demand, with prospects of some good orders being placed later on. Furnacemen speak of higher prices; however, they continue to book orders at current quotations, which are: No. 1 Foundry, \$23.50 @ \$24.50; No. 2 Foundry, \$22, and Gray Forge, \$20 @ \$21, all at furnace.

Foreign Iron—Is without interest; buyers are holding off, and sellers are not urging matters. Bessemer is quoted to-day, \$24.75 for August shipment. There was an inquiry for a 1000-ton lot of 20% Spiegeleisen; sellers quoted \$36.75, but buyers' idea was about \$1 less. We have not heard of it being placed in this market.

Muck Bar—Is steady and firm, with a good demand. Some fairly large orders have been placed at about \$42.50. We quote \$42 @ \$43.

Blooms—Are in good demand. Prices are firm, and held at full quotations. There is no difficulty in placing orders for fairly prompt delivery. We quote: Charcoal Blooms, \$72.50; Run-out Anthracite, \$60

@ \$62.50; Scrap Blooms, \$52.50 @ \$55; and Northern Ore Blooms, \$47.50 @ \$50.

Bar Iron—Is moderately active; consumers are very conservative, and are not buying much in advance of actual wants. An order for a large lot for car purposes has been placed at something in the neighborhood of 2.55¢. Sales, however, are mostly for small lots. Prices are inclined to be irregular, and while some quote 2.6¢ firm, others name 2.5¢ @ 2.55¢.

Structural Iron—No transactions of any account are reported. There is, however, a good demand for ordinary-sized lots, which keep the mills full. Prices are firm and steady. There are some inquiries from the West, but we hear of few sales for such shipment being effected. We quote: Angles, 2.9¢ @ 3¢; Tees, 3.75¢ @ 3.87½¢; Beams, 4¢, and Channels, 4.2¢.

Plate and Tank Iron—It is hardly necessary to say anything in regard to Tank Iron, beyond the fact that the mills are crowded with work. There is more inquiry for Boiler Plate than there has been for some time past. We repeat former quotations: Tank, 3.3¢ @ 3.5¢; Shell, 4¢; Flange, 5¢; and Fire-box, 6¢.

Sheet Iron—The demand appears to be increasing, and prices show a tendency upward, although manufacturers show little disposition to change quotations. Stocks are very low, and will have little chance to accumulate under increased demand. Quotations are about as follows:

Common Sheet, No. 27 and 28.....	5.25
Common Sheet, No. 26.....	5.00
Common Sheet, No. 25 to 23.....	4.75
Common Sheet, No. 16 to 21.....	4.50
Best Refined $\frac{1}{2}$ ¢ advance on the above.....	
Best Bloom Sheets, No. 26 to 28.....	79
Best Bloom Sheets, No. 25 to 23.....	61
Common Red Plates, 3-16 to 16.....	61
Common Red Plates, 3-16 to 16.....	3.86
Blue Annealed, 3-16 to 16.....	40
Best Bloom Galvanized, discount.....	30
Second quality, discount.....	40

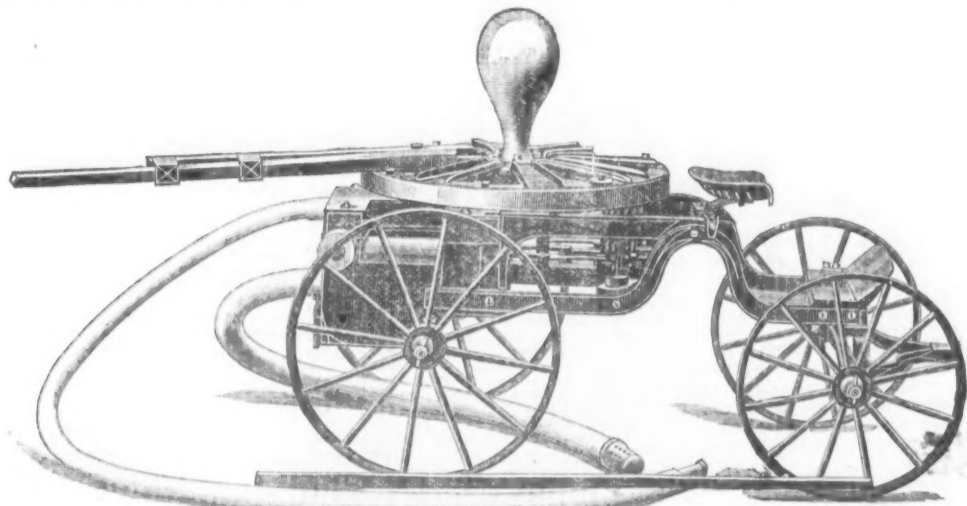
Steel Balls.—The demand for ordinary

Semin Line wants 1000 at once. A great meeting of mine owners and iron masters has come off at Prague, in Bohemia, for consultation on joint interests. A committee of trustworthy, influential individuals has been appointed to report at the next meeting; it is hoped that some practical results will be obtained. Crop prospects are improving in Austria-Hungary, but their good effect on business is to some extent neutralized by the mixed up condition of European politics and the dull spell of the midsummer season. The apathy thus brought about does not, however, prevent

The Remington Fire Engine.

The Remington Agricultural Company, of Ilion, N. Y., have recently perfected a novel fire engine, especially designed for use in villages, suburbs of cities, manufactories on farms, and in any situation where a cheap and powerful fire engine is desirable. A general view of this apparatus is shown in

warming the pumps sufficiently to prevent freezing in extreme cold weather. The manufacturers state that this engine is always ready for work, and is nearly as effective as a steamer, while the cost is less than half the latter. The services of an engineer, foreman, mechanic or other expert are unnecessary, as the machine is almost as simple as an old-fashioned hand engine.



The Remington Steam Fire Engine.—Fig. 1.—General View of the Apparatus, Arranged for Hand Power.

Iron from becoming firmer and firmer. We quote: Fig. 1 @ 50 florins 100; Marchant, 110 @ 125; Sheets, 165 @ 105; and Beams, 125 @ 130. Metals have been quiet and irregular. We quote: Copper, 82 @ 90 florins 170 kg; Tin, 124.50 @ 128; Lead, 16.50 @ 10.50; and Spelter, 21 florins.

HOLLAND.

(Koch & Viterboom.)

ROTTERDAM, July 8, 1882.—Tin.—The position of this metal has improved very materially, from a statistical point of view, and as soon as speculators shall come forward a little more resolutely and start an upward movement, a great advance may be the result. So far, they seem to hesitate. For actual requirement a good deal has been done during the week at 61.25 @ 61.50 guilders 50 kg. for Banca, and 61 for Billiton, spot; October futures of the latter, 61.50.

CHILE.

(Weber & Co.)

VALPARAISO, May 26, 1882.—Copper.—Both the better advice from England and the drop in Exchange have contributed to impart liveliness to our Copper market, and, beside 47,000 quintals

Fig. 1 of the engravings, while an end and side elevation and plan are shown in the cuts following. The engine is built of metal, very little wood being employed except in the levers used for operating the pumps. It is mounted on four wheels, and weighs in working order 2600 pounds. The axles, tires and spokes are of wrought iron, the hubs and felloes of cast iron. The diameter of the rear wheels is 40 inches, and that of

There is no waiting for a supply of fuel, nor time lost in getting up steam; no danger of boiler explosion, no flues to burn out or rust, and, of course, no expensive repairs. It combines economy, portability and effectiveness. It can be quickly transported by men or horses, and can be taken where it would be impracticable to move a heavy machine. Besides its usefulness as a fire apparatus, there seems to be

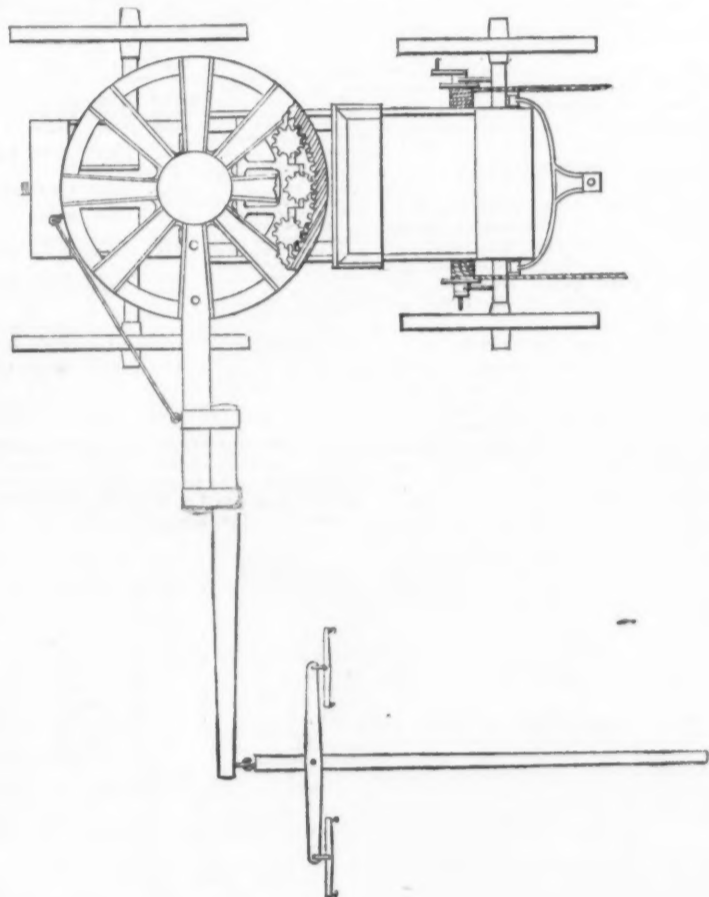


Fig. 4.—Plan showing Arrangement for Horse Power.

the forward wheels 34 inches. A glance at the engraving shows the essential features of this apparatus. There are three piston pumps so arranged and connected that their combined action produces a continuous pressure and even flow of water, thus avoiding the vibratory motion so destructive to conducting hose. These pumps are operated by

a very large field for it among contractors, not only in smaller towns, but even in cities, while in many quarries and mines the machine will be especially valuable. Its low price, varying from \$300 to \$1200, makes it possible to use it in many situations where more costly apparatus, requiring skilled labor and expensive repairs, is out of the question. In some portions of the country it will be available for irrigation, and will, no doubt, be well adapted for this purpose.

The World's Production of Lead in 1881.—Herr Landsberg, the general manager of the famous Stolberg Company, has, in an annual report to his company, given an estimate of the production of lead in Europe for 1881. The following is Herr Landsberg's estimate for Europe: Spain, 120,000 metric tons; Germany, 90,000; England, 67,000; France, 15,000; Italy, 10,000; Greece, 9,000; Belgium, 8,000; Austria, 6,000; Russia, 15,000; total, 326,500. Herr Landsberg estimates the production of the United States at 110,000 tons. As the output of Mexico, South America, Canada, and Australia is small, it is probably safe to assume that the world's production is about 440,000 tons of lead. This does not include China, which is a heavy consumer of lead, and is, not unlikely, a producer of some importance; nor does it include Japan, of whose output we have no figures. It will be seen, therefore, that the United States take second rank among the lead-producing countries of the world.

Implement Catalogues Wanted.—The "Uzdunaja Zemskaja Upravu" invite the makers of agricultural implements and tools, mining and other machinery makers, to send their illustrated catalogues into Russia to the following address: "City of Bahmut, Government of Ekaterinoslav, to Uzdunaja Zemskaja Upravu." It is desirable that the extreme discount off the printed price should be noted. It will be useful to calculate the charge for sending the tools to the city of Tanguarog, on the Sea of Azov, whence there is a direct railroad to Bahmut, a distance of less than 100 sea miles.

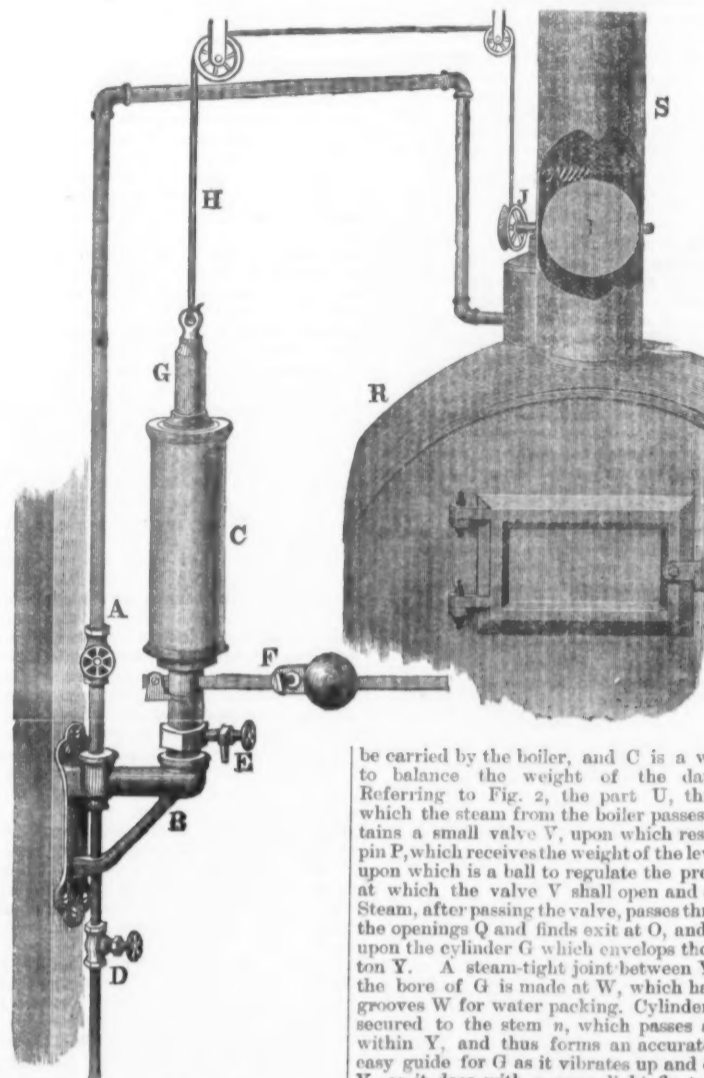
Kellam's Damper Regulator.

One of the most desirable methods of maintaining a constant and equal steam pressure in a boiler is that of regulating the draft by means of the damper, so that as the consumption of steam decreases, the consumption of fuel shall also decrease, and the waste of steam through the safety valve shall be avoided. A damper regulator that will do this effectually is, at the same time, a valuable safety appliance, since it will pre-

vent, by checking the combustion, an undue increase of steam pressure, even though there be no steam taken from the boiler. Usually damper regulators have been operated through the medium of water, rather than of the steam direct, and their weight has been greater than the nature of the duty seemed to demand. In the engravings herewith shown, however, is presented a design

inch in the boiler causes a very perceptible movement of the damper, and a variation of 2½ pounds is sufficient to fully open or close the damper, as the case may be.

The construction by means of which these excellent results are obtained is as follows: In Fig. 1 the general application is shown, and in Fig. 2 the construction of the parts. Referring to Fig. 1, A is the steam pipe from the boiler to the regulator; B, a stand to support the regulator; F, a valve to adjust the regulator to suit the pressure of steam to



Kellam's Damper Regulator.—Fig. 1.—General View of the Apparatus.

be carried by the boiler, and C is a weight to balance the weight of the damper. Referring to Fig. 2, the part U, through which the steam from the boiler passes, contains a small valve V, upon which rests the pin P, which receives the weight of the lever F, upon which is a ball to regulate the pressure at which the valve V shall open and close. Steam, after passing the valve, passes through the openings Q and finds exit at O, and acts upon the cylinder G which envelops the piston Y. A steam-tight joint between Y and the bore of G is made at W, which has the grooves W for water packing. Cylinder G is secured to the stem N, which passes at N' within Y, and thus forms an accurate and easy guide for G as it vibrates up and down Y, as it does with a very slight fluctuation of boiler pressure.

When the steam pressure rises above what is required, the valve V opens, admitting steam, which lifts G, and closes the damper. As the pressure falls the valve V closes and

vent, by checking the combustion, an undue increase of steam pressure, even though there be no steam taken from the boiler. Usually damper regulators have been operated through the medium of water, rather than of the steam direct, and their weight has been greater than the nature of the duty seemed to demand. In the engravings herewith shown, however, is presented a design



Fig. 2.—The Cylinder, with Details of the Valve.



Fig. 3.—Detail of the Piston.

the damper opens; finally, after valve V has closed, the steam in G condenses and the damper opens wider and wider, being full open when G has fallen to its lowest point. Under ordinary conditions the damper is partly closed, and G fluctuates up and down upon Y as the boiler pressure varies, each motion of G producing a corresponding motion at the damper. Mr. Frank A. Hine, of 81 Maiden Lane, New York City, is the general agent for this apparatus.

Sheffield Trade with America.—During the quarter ending June 30 last, steel has been exported from the Sheffield district to the United States to the value of £105,929, and cutlery £53,673, as compared with £82,925 and £55,577 for the corresponding quarter of 1881. Steel itself has an increase of slightly over £23,600 in the quarter, and cutlery a decrease of £1904. On the gross export there is a decrease of £34,147, the total exports for last quarter being only £326,440, while for the June quarter of 1881 they were £360,587. It is evident that the decrease is owing chiefly to a lessened business in steel rails, Bessemer blooms and other heavy goods.

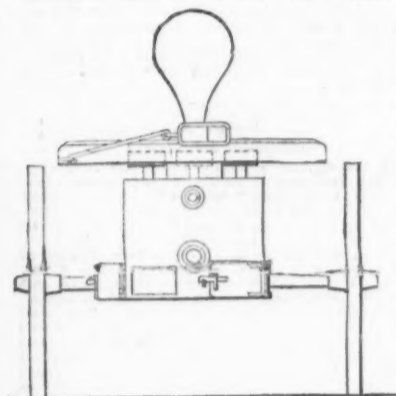


Fig. 2.—Rear Elevation.

Regulus at \$2.40 @ \$3.60 for 50%, there have changed hands 50,667 quintals Copper at \$18.50 @ \$19.50, the latter the closing figure on board. Nitrate.—Everything has combined to cause a dull state of affairs, sales not exceeding 300,000 quintals at \$2.75 @ \$2.75 for 50% and 98%. Chartered 16,500 tons for Europe, and none for the United States. Dating from July 1 next Taital will pay the same export duty as the remaining nitrate ports; perhaps this will stop work there outright. Coal has improved to 31/ Newcastle, and 25/ smelting, less being afloat. Exchange 34¼ @ 34½, 90 days.

EAST INDIES.

(Giffillan, Wood & Co.)

SINGAPORE, June 7, 1882.—Tin.—Sales during the past fortnight do not amount to much more than 100 tons. The market has continued steady, prices fluctuating between \$29.8½ and \$30.12½ pica. Freights.—There have been numerous arrivals, and rats have declined to 45/ for dead-weight. For New York cargo is very scarce, and although the Skoto has taken some freight, she is not fully engaged. The Peter Rickmers has been placed on the berth, but has secured very little cargo. For Boston the Lizzie H

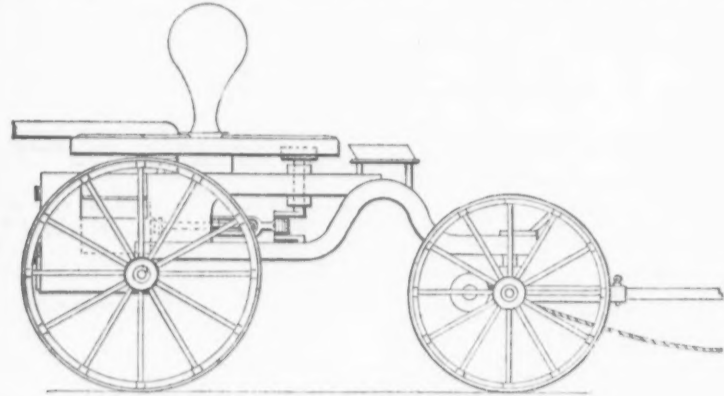


Fig. 3.—Side Elevation.

loads on secret terms. Exchange—is weak at 3/10½ @ 3/10½ for 6 months' London. The Jason took for New York 1650 piculs.

Tidman, Balfour & Co.

BATAVIA, May 27, 1882.—Metals.—Though the season advances, business has not yet got into full swing again. Nothing was done in either Swedish Iron or English Bars. Sheets have been done at 100/ and some tire iron at 7/5; Galvanized Corrugated Sheets at 14 @ 14 7/5; 3/4 and 5/8 Steel has found buyers at 8.50; Sheet Lead at 18; English Copper Sheathing, light weights, at 67; Tin Plates at 14, and Wire Nails at 12. Coal.—No sales and no arrivals.

(Hessemer & Co.)

COLOMBO, June 12, 1882.—Plumbago.—The market is bare and the demand fully equal to the supply. We quote in rupees, 100 lbs: Fine Lump, 1.0 @ 1.50; Ordinary, 1.35 @ 1.45; Chubb, 70 @ 75; and Dust, 50 @ 55.

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Di. of screw.	Height.	Net wt.	Whole height.	List Price.
1 1/2 inches	6 inches	6 lbs.	12 inches	\$2.50
1 3/4 "	8 "	8 "	14 "	3.00
2 "	10 "	10 "	16 "	3.25
2 1/4 "	12 "	12 "	18 "	3.75
2 1/2 "	14 "	14 "	20 "	4.00
2 3/4 "	16 "	16 "	22 "	4.50
3 "	18 "	18 "	24 "	5.00
3 1/4 "	20 "	20 "	26 "	5.50
3 1/2 "	22 "	22 "	28 "	6.00
3 3/4 "	24 "	24 "	30 "	7.00
4 "	26 "	26 "	32 "	8.00
4 1/4 "	28 "	28 "	34 "	8.50
4 1/2 "	30 "	30 "	36 "	9.00
4 3/4 "	32 "	32 "	38 "	11.00
5 "	34 "	34 "	40 "	13.00

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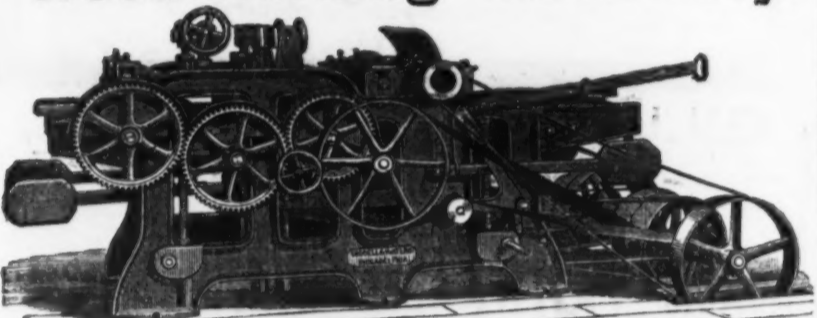
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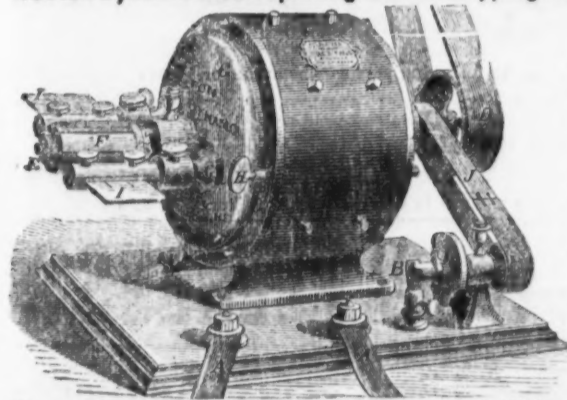
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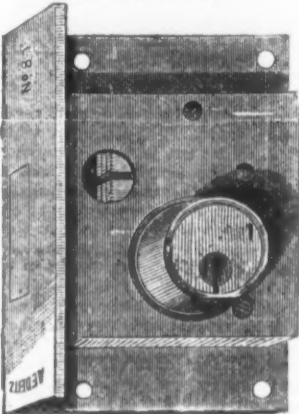
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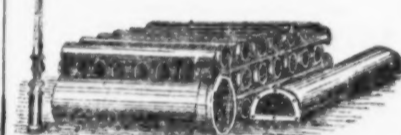
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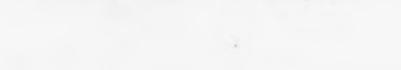
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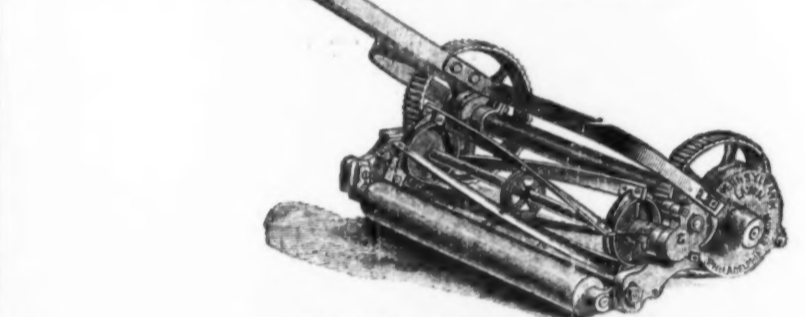
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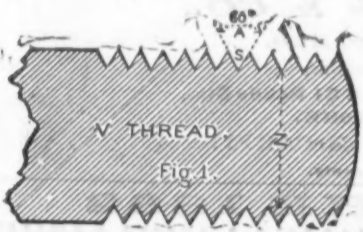
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Standard Screw Threads on Cars.

At the annual convention of Master Car Builders, held last month at Philadelphia, Mr. M. N. Forney, as chairman of the committee appointed to "investigate and report on the present construction of screws and nuts used in cars," presented his report, from which we give our readers the following summary and extracts:

"The committee to whom this subject has been referred, and who have had it under consideration for several years, find that to give a clear understanding of it a brief historical review of what has been done is requisite. Without other introduction, then, it may be said that in 1864 the inconvenience and confusion resulting from the diversity in the screw threads used in machine and other construction were brought up for consideration before the Franklin Institute, of Philadelphia. A committee was then appointed to investigate and report on the subject. That committee recommended the system designed by Mr. William Sellers, and the Institute afterward adopted their recommendation. Practically the three systems from which they were obliged to choose were, first, the ordinary sharp V-thread, shown in Figs. 1 and 2. Fig. 1 represents a section of an inch bolt full size, and Fig. 2 a section of the thread enlarged eight times its actual size. Figs. 3 and 4 show Whitworth's thread, and Figs. 5 and 6 Sellers' system. The angle A and A' between the



Standard Screw Threads.—Fig. 1.—A Full Size Section of an Inch Bolt cut with a V-Thread.

sides of the V-thread is generally 60°, although this is not uniformly so; when it is, the depth D, from the root of the threads to the point, is slightly less than seventh-eighths of the pitch. In the Whitworth thread the depth D is two-thirds of the pitch, and the top and bottom of the threads are then rounded as shown. The angles A and A' of the sides of the threads to each other are 55°. In a report made in 1858 to the Chief of the Bureau of Steam Engineering of the United States Navy, by a board of engineers, the difference in the resistance to tension and torsion of bolts with Sellers' threads, compared with those having V-threads, was calculated, and the results obtained may be approximately summed up by the statement that the smaller bolts, with the Sellers thread, have about a quarter more strength, the medium-sized ones a sixth more, and the larger ones an eighth more strength to resist tension than screws having an ordinary V-thread. The resistance to torsion of screws with the Sellers thread is about a third, a quarter and a fifth greater than those with a V-thread."

These advantages of the Sellers thread found recognition in their adoption as standard in the naval service, by the Master Mechanics, and lastly, by the Master Car-Builders' Association. The report then goes on to say that unfortunately, though, when this was done, a large proportion of the members of the two last-named associations seemed to have the impression that the Sellers system consists simply in a standard for the number of threads to the inch, and apparently not sufficient effort has been made to impress the fact on the minds of those who have the control of such matters that three features are essential to the Sellers system:

1. Screws must have a given number of threads per inch.
2. The threads must be of the form and proportions designated.
3. The diameters of the screws must conform to the sizes specified.

A screw which does not conform to the Sellers system in all three particulars has not a legitimate Sellers thread. There is no such thing, for example, as a Sellers screw 11-16 inch in diameter. That size is not recognized and has no existence in the system, and if a screw is made, as is often done, $\frac{1}{4}$ inch in diameter, "a sixth-fourth" or "a thirty-second," large it ceases to be a Sellers screw. Uniformity in diameter is as essential to interchangeability as uniformity in the number of threads per inch or the shape of the threads, and the importance of maintaining the former cannot be too strongly urged on this association. Just as soon as the practice is introduced of making screw threads "over-size," or a thirty-second or sixty-fourth large, interchangeability of bolts and nuts becomes impossible. If the Sellers standard is adopted, no screws should be tolerated which are a fraction of an inch larger or smaller than the diameter specified for that system. But, while the form, proportions and dimensions of the standard screw threads were as definitely fixed by Mr. Sellers and the action of the Franklin Institute as it is possible for them to be, and although it was thus made plain what the standard screws should be, subsequent experience showed that it was not so easy as it appeared to make them conform with a sufficient degree of precision for practical purposes to the requirements laid down by Mr. Sellers.

In illustration of this, the report cites the experience with standard taps and dies on the Erie road: "In 1874 the Sellers system

was adopted on the Erie road, and a set of standard taps and dies had been furnished to each of the shops on that line, which as they wore out were replaced by others made from the originals at each of the shops. In 1876 attention was called to the fact that some nuts cut at one shop would not fit bolts cut at others, and an investigation was

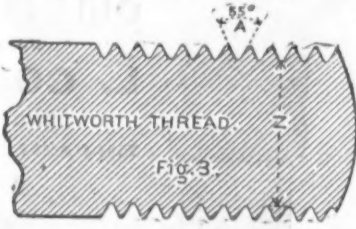


Fig. 3.—An Inch Bolt having the Whitworth Thread.

made. A set of nuts of the different sizes were cut at each of the shops, and were sent to Messrs. Pratt & Whitney, who fitted soft plugs made of Babbitt metal into each of these nuts. By taking at random a plug and a nut of nominally the same diameter, it was found that the one would rarely fit the other. It was seen that not only were the diameters different, but in many cases the pitch and angle of the threads had been altered from the original standard, and the taps made at different shops did not conform to each other. Nuts were taken from 23 or 24 foreign cars, and these not only were unlike their own screws, but were also unlike each other. Subsequent inquiry elicited the fact that the manufacturers of taps and dies had been working to different standards. Soon after the Sellers standard was recommended by the Franklin Institute, a number of sets of their new standard screw gauges were made by Mr. Fox. One of these sets is at the Brooklyn Navy Yard, and others were bought by manufacturers of taps and dies, and were used as standards to which they worked, while the Pratt & Whitney Company undertook to work to what they regarded as a true inch, and the fraction thereof. As neither the inch nor the gauges were certainly known to be correct, it is not remarkable that the bolts and nuts cut with tools made by different manufacturers were not interchangeable."

The question came up which was right. The report then recites the successive steps taken in the efforts to procure a standard measure, which led ultimately to the connection of Prof. W. A. Rogers, of the Cambridge Observatory, with Messrs. Pratt & Whitney, and resulted in the production by that firm of a comparator, or measuring machine, from the plans of Professor Rogers, which in regard to accuracy seems to leave little to be desired, since it is capable of measuring 1-50,000th of an inch with absolute

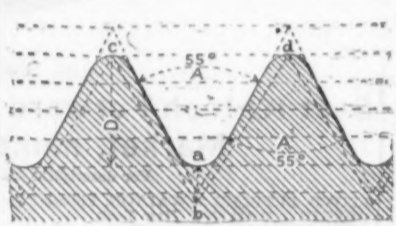


Fig. 4.—A Section of the Whitworth Thread Enlarged Eight Times.

certainty. The standard bars used by the Pratt & Whitney Company were first prepared by them, and were graduated by Professor Rogers, and were then sent to Washington to be compared with the standards there. Professor Hilgard reported that one bar was 0.000053 inch longer than the imperial yard, and another was 0.000036 inch shorter than this unit; the mean of the two bars differs from the imperial yard by a quantity less than the certainty with which such comparisons can be made, viz., 0.00001 inch.

But it may be asked, in what way are car-builders concerned, or of what practical value are such extremely minute and exact measurements to them? In reply it may be said that much smaller measurements than persons usually suppose are of importance in ordinary work, and, as a matter of fact, workmen are constantly in the habit of measuring, with calipers and other means, quantities as small as 0.001 of an inch, or even much less than this. This was illustrated by a plug and ring which was exhibited. The former was $\frac{1}{2}$ inch in diameter, and fitted the ring as nearly perfect as it is possible to make it fit. The second plug is 0.001 of an inch smaller than the first one. The second one fits so loosely in the ring that you can feel it shake. A good machinist, in fitting the pins in a link motion, can easily discern a difference of much less than 1.001 inch in the diameter of the pins or their bearings. If the latter are of the right size and some of the pins are that much too large, interchangeability will be impossible. The same thing is true of screws and nuts. To illustrate this, a $\frac{1}{2}$ bolt and nut were shown, the two being an example of an ordinary good fit. Another bolt 1-500th smaller in diameter was also exhibited. The nut was so loose on the latter that any good mechanic would pronounce it a bad fit and a bad job. It will thus be seen that in practice a very considerable amount of precision is required in order to secure good workmanship. As a matter of fact, there are no serious difficulties in maintaining such a degree of precision in practice, if there only is some standard to work to. To maintain a system of screw threads which shall be interchangeable, it is essential that they be made to some common and exact standard of measurement. The uncertainties of 2-foot rules are too great to maintain an interchangeable standard when as much precision is required as is needed in screws. If the shops and manufacturers have standards of measurement which do not agree, the screws made from them will, of course, not be alike. It is essential, therefore, that there should be uniformity in the standards. This it is extremely difficult to bring about, and unless the standard proposed is as near right as it can be made, it will be impossible to secure its general

adoption. Besides being important that standards should be exactly right, it is essential that it should be possible to reproduce them to any extent that is desirable, even though the original was lost. This the Pratt & Whitney Company has supplied the means of doing.

The report then furnishes a brief description of the manufacture of tap or screw gauges: "The first step in making a tap or screw gauge is to turn a bar of steel to the exact diameter of the outside of the screw. Then each end of the portion on which the thread is to be cut is turned down to the diameter of the screw at the root of the thread. On the exactness of this first operation the precision of the ultimate size of the gauge or tap will depend. It is therefore essential to be able to measure exactly these two diameters. The next step is to cut the thread. To do this a tool must be ground which will cut a thread whose sides will have an angle of exactly 60° to each other. An amount equal to one-eighth of the pitch must be taken off the point of the tool, the flat portion being true to the sides of the thread. To make a true thread the tool must then be set so that its center line will be square with the axis of the screw. In order to be able to do this the sides of the tool are ground so as to be true parallel planes, and the parts which cut the sides of the thread are ground so as to be true with the sides of the tool and at an angle of 60° to each other. It can then be set true in a lathe with a square bearing against its sides, and against the blank tap or headstock of the lathe. What adds to the difficulty, though, is the fact that a cutting tool of this kind does not stand ver-

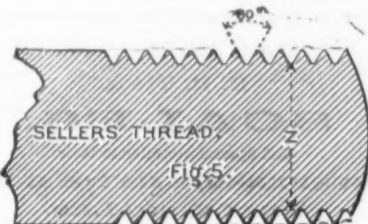


Fig. 5.—An Inch Bolt with the Sellers Thread.

tically, but at an angle of 20° to a perpendicular line. The top surface is horizontal. Now, if the portions of the tool which conform to the sides of the thread were ground with an angle of 60° to each other, the edges of a plane which intersects these sides at an angle of more or less than 90° would not be inclined at an angle of 60° to each other. For this reason the tool must be ground at an angle of somewhat less than 60°, so that the cutting edges formed by the intersection of the flat top surface and the inclined edges of the tool will be exactly 60°.

It would be impossible, without elaborate illustrations, to give a description of the delicate instrument which is used to measure the exact amount which should be taken off the point of the tool for cutting threads of various sizes. It must be sufficient to say that this too is done with the highest degree of precision. These processes and appliances are required to make a turning tool of the exact shape and size to cut the threads of screw gauges. With such a tool, then, and a blank for a gauge such as has been described, it would seem that by cutting the thread so that the point of the tool would just touch that part of the blank which has been turned down to the size of the screw at the root of the thread, the screw must be of exactly the right size. If, as has been said, all the work described has been done with absolute precision, such will be the case; but in order to verify it, the same tool used for cutting the thread is put into a planer or shaping machine, and a template is cut with it out of a thin piece of steel. The space cut out of the steel plate will, of course, be an exact duplicate of the space between the threads. As the spaces at the root of the threads should be exact counterparts of the point of the threads themselves, the latter can be measured by the template, and if they are exactly alike it will indicate that all the operations have been performed with the required precision. If so, the screw thus made supplies a true gauge to work to. It should be kept in mind that the sides of the threads of a screw are, or should be, the actual bearing surfaces, and that in making taps and dies, the threads should be measured over the sides. With such a gauge as will be supplied by the screw described, it is an easy matter to set an ordinary pair of calipers over the sides of the threads, and then reproduce that size in any number of other screws or taps. A skillful tool maker will measure with ordinary calipers to within 1-2000th of an inch, provided he has a correct gauge to set his calipers by. Experience has shown that with a gauge of the kind described to work from, a very high degree of precision can be attained, but it was also found that it was always necessary to make an allowance for the wear of the

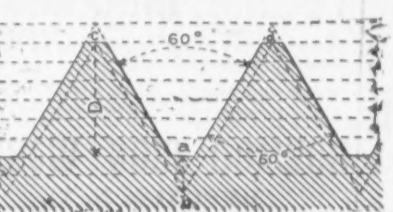


Fig. 6.—Enlarged Section through the Sellers Thread.

cutting tool which occurred when it was first used, and therefore to make it somewhat larger than the actual size of the thread.

But there is still another difficulty with screw gauges. If they are made as described, the steel must, of course, be soft, and a very little use would soon destroy their accuracy. It is therefore requisite that working gauges should be hardened. The process of doing so, however, changes their form and dimensions slightly, so as to destroy their accuracy. To get over this difficulty hardened gauges are made somewhat larger than the standard size. The Pratt & Whitney Company have devised a plan to grind these gauges, after they are

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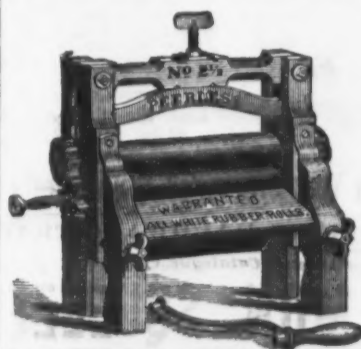


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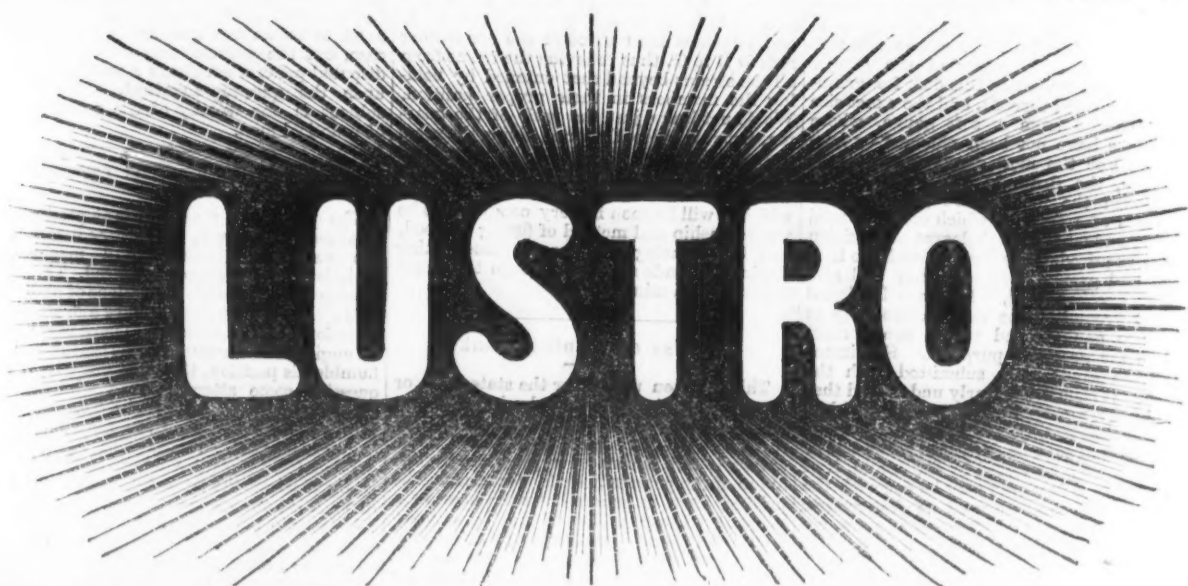
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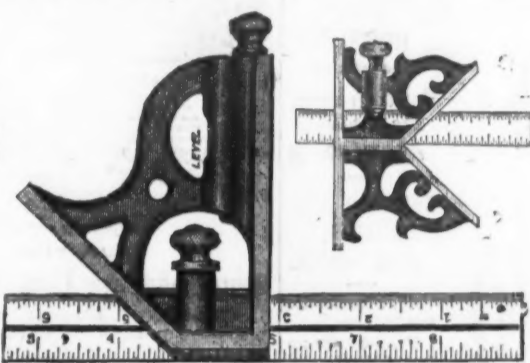
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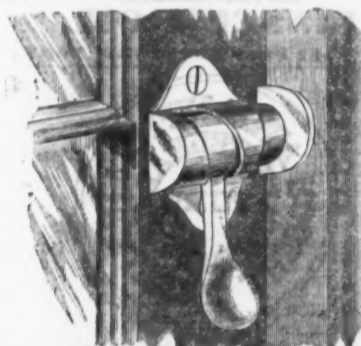


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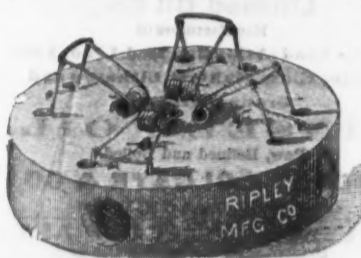
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*See The Iron Age first issue of the
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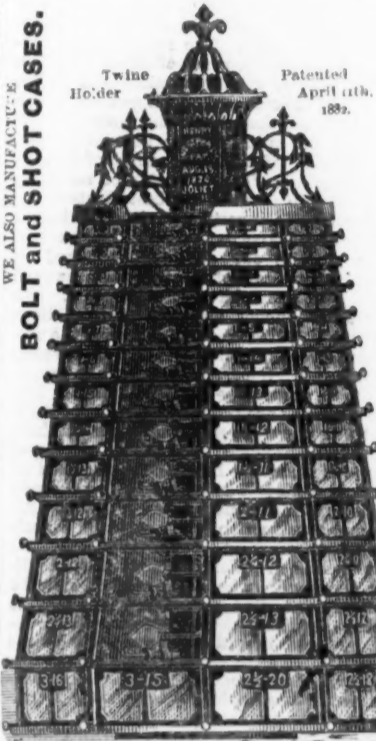
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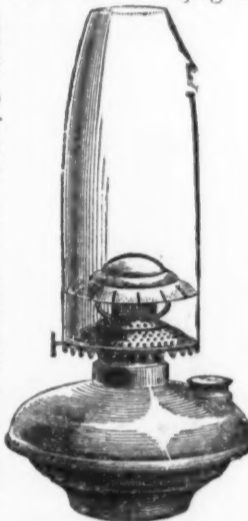
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Descriptive circular on application



hardened, to the exact size, form and pitch. To do this the gauges are put into a lathe, and a rapidly revolving steel disk or wheel is attached to the tool holder, which is moved by the lead screw, whose pitch is exactly that of the screw of the gauge. Diamond dust is used on this disk for grinding the hardened threads, and the exact size is reproduced from a soft gauge, whose dimensions have not been changed by hardening. For the most exact standards of reference, the Pratt & Whitney Company recommend the unhardened gauges. For standards of reference which must be used often, and where a high degree of precision is also required, they recommend the hardened and ground gauges. They will also furnish another kind, which are hardened but not ground, to be used in the shop as reference gauges, and which are correct enough for practical purposes. Specimens of all the kinds were submitted with the report. It should be clearly understood that none of these gauges are intended for shop use, and that if subjected to much wear their accuracy will soon be destroyed. The size of new taps may be tested by them, and, if of correct size, a few nuts may be cut with the new taps, and these be used as shop gauges by the workmen. As these wear they can be replaced with new nuts cut with other new taps.

The report concludes with the following recommendations:

"That this Association deprecate the use of screws larger or smaller in diameter by a small fraction of an inch than the sizes specified for the Sellers or Franklin Institute

clutch arranged to "stop up," that is, to leave the press at the highest point of the stroke. It will be seen at a glance that the strain comes on the shaft, which is of steel, and is transmitted through the connecting rods D D to G, thus relieving the frame from all the strains beyond that entailed by holding the members in their proper position. We do not know just the ratio of the gearing, but it is evidently large, giving the press very great power. Many of the largest establishments in the country doing work in heavy metals are using this form of press, which it will be seen is very compact. The workmanship and method of fitting is good, and the wearing surfaces or those taking strains are made sufficiently large to reduce the wear to a minimum.

The Use of Printed Blanks.

This is often urged for the statement, or record, of ordinary routine business of machine shops, and all similar places, but the real value of such appliances as actual labor-savers is not known or appreciated by one in ten of the persons actually concerned. The printed form is generally looked upon as a piece of red tape, useless to the "practical" man, and hence avoided whenever and wherever it possibly can be. Whereas the real fact is that it ought to be used habitually for the statement of every transaction or detail of work which is a matter of regular occurrence, whether daily, weekly or monthly. It is true enough that the use of any form of bookkeeping, or of any number of printed

calculations shall be made in such form that he, without preparatory study, shall be able to understand them, that is, that no one shall be permitted to make them at all. This may seem to be an extreme way of putting the case, but the extreme method of stating a disputed point often sheds a wonderful light upon the question involved. The whole subject is one worthy of the consideration of practical men.

Standards of Measurement.

The question of standards is at present one of absorbing interest. At every meeting of the various engineering and mechanical societies standards are considered. The technical press teems with discussions of standard screw threads, standard gauges and standard sizes for different articles. There is scarcely an engineer or mechanic in the land, however humble his position, that has not given this question some attention, and who has not some ideas upon the subject. The necessity for uniform sizes, accurate fits and interchangeable part, is too well known and appreciated to require argument. All are ready to admit the desirability of a standard in each of the several directions in which standards may be discussed, however much they may differ among themselves as to what the several standards shall be, or what means shall be employed in establishing a standard.

The real question, therefore, is not with reference to standards in the abstract—the expediency of employing standards—but, rather, what shall be used as a standard in each of the several departments, and what means are best to employ in producing and duplicating the standard when it has been selected. These, at first, seem simple matters, and without consideration one is surprised that long years of labor and large sums of money should have been expended in attempts at solution. The refinement of accuracy embodied in much of the mechanism of the present day, recognizes almost infinitesimal differences. Inch gauges, which differ between themselves the thousandth of an inch, are unfit for use in most places. The difference of a ten-thousandth of an inch between two yards is a matter of sufficient importance to warrant the best efforts of the ablest scientific investigators in an endeavor to show which is correct and which is in error.

The yard is our accepted standard of length, but we cannot measure with the yard alone. We must have it subdivided. We require feet, inches, and even small fractions of an inch. Given a standard yard, the mechanical problem of its accurate subdivision is presented. What are the means to be employed to accurately divide its length into such spaces as are required in small measurements, and how are the equivalents of those spaces to be produced in the shape of gauges, plugs, rings and the like, as are required in practical work? These questions are largely problems of mechanical detail of machine design and construction, and are to be considered in a measure, independent of the method or scheme upon which it is undertaken to divide the yard. The same method may be variously embodied in devices which may be made to facilitate the solution of the problem. No two investigators are likely to see entirely alike as to requirements in matters of this kind, and scarcely any two designers or constructors would employ means identical in all particulars for producing the results specified, even though working upon the same scientific method. There is room for discussion at every step of the way.

NEW PUBLICATIONS.

STANDARD MEASURES OF THE UNITED STATES, GREAT BRITAIN AND FRANCE. By Arthur S. C. Wurtz. Pamphlet. Published by E. & F. N. Spon. Price, 50 cents.

This little book, by a member of the Society of Civil Engineers, is very timely, and contains much that will be of interest to those who are investigating the subject of fine measurements and standards. It contains the history of standard measures from their introduction in 1736 by the Royal Society up to the present time, with actual comparisons of the measures made at various times in the United States, Great Britain and France. The origin of the meter and comparative results, according to Delambre, Bessel, Airy and Clarke, are presented. Tables showing the reduction of the French toise into English feet, the meter into inches, and the length of the seconds pendulum, as given by different writers, are also presented. The appendix to the pamphlet contains the "disadvantage in the practical use of the metric system, and the inconvenience attending its adoption," as they appear to the author. One or two paragraphs in the appendix will bear quotation in this connection. In his arguments against the adoption of the metric system the author refers to the fact that even in France the metric system is not wholly decimal in actual practice. He says: "We find the following measures in use in addition to the decimal divisions—double decimeter, demi-decimeter, double meter, demi-meter, and double decimeter." The final paragraphs in the appendix are as follows: "In past centuries all the work and records of English speaking peoples, now numbering 100,000,000, and increasing and progressing faster than all other nationalities, as well as being closely connected by descent and business, have been done and recorded under the yard system, and any change now would unavoidably render necessary continual reduction, to the great detriment and inconvenience of the mass of our people, and with little or no practical benefit except, perhaps, to a small class of scientific and pseudo-scientific people, who can and do amuse themselves with the fancied uniformity of the meter. All our numerous text-books and tables, mechanical and scientific, would be rendered entirely useless by the change, and this is a serious final consideration."

PROCEEDINGS OF THE ENGINEERS' CLUB, OF PHILADELPHIA, FOR MARCH, 1892.

This pamphlet is No. 1, Vol. 3, of the proceedings of an engineers club that is becoming well known throughout the country. The opening article is the annual address of the president. The frontispiece is a portrait of Mr. Strickland Kneass, the retiring president, and as a piece of art work is very good. It is of the style of picture known as

a phototype, and was done by F. Gutekunst, of Philadelphia. Following this is the opening address of Rudolph Hering, president for the current year. The principal papers contained in this number are, first, "On the Relative Tensile Strengths of Long and Short Bars," by Prof. W. S. Chaplin. This is illustrated with diagrams and accompanied by tables. The succeeding paper is "How to Establish a True Meridian," and is by Prof. L. M. Haput. This is also illustrated by diagrams. The annual report of the secretary and treasurer, notes and communications, abstract of minutes of meetings, contributions to the library and a list of members complete the work.

The Board of Managers of the American Iron and Steel Association met at Cresson Springs, Pa., on the 25th inst., and adopted a call for a general convention of all iron ore producers and iron and steel manufacturers in the United States, to meet there on Tuesday, September 12, to consider the duties on iron and steel and iron ore, and prepare a report thereon, to be submitted to the Tariff Commission. In the meantime, it is recommended to the various local iron and steel organizations in the country that they meet and consider the duties in which they are respectively interested.

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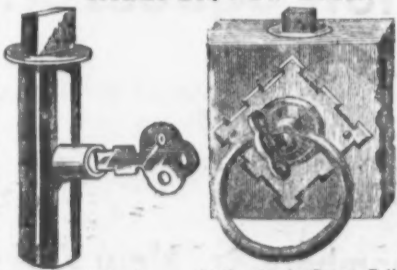
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Manufacturers of the well-known brand of
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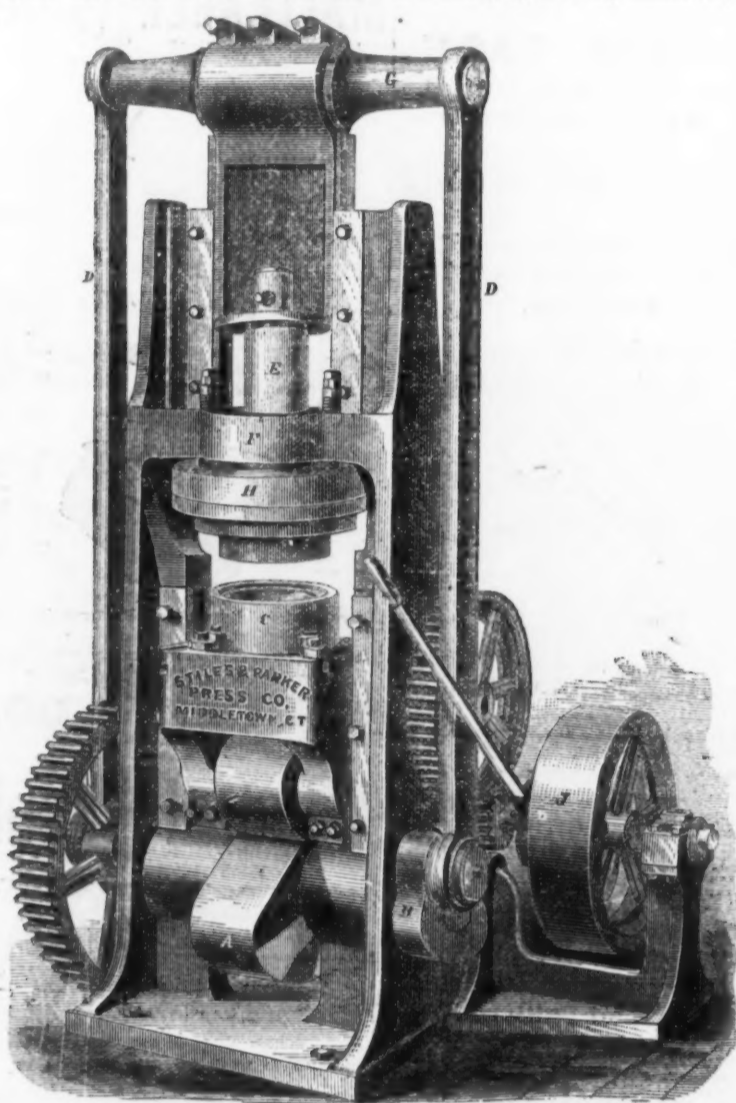
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Drawing Press, Built by the Stiles & Parker Press Co., Middletown, Conn.

system, and that all its members are urged to abandon entirely the use of over or under size screws.

"That the thanks of this Association be voted to the Pratt & Whitney Company for the intelligence, liberality and enterprise shown in their efforts to establish a system of accurate gauges for screws and for tools for precise measurement.

"That the committee which prepared this report be instructed to send a copy of it with a suitable circular, calling attention to the importance of adopting the correct standard Sellers system of screw threads to the presidents, managers, superintendents and master car builders of the United States, Canada and Mexico, and that when the committee has performed that duty it be discharged."

A New Drawing Press.

We illustrate above a new drawing press by the Stiles & Parker Press Company, Middletown, Conn. The press is one combining great power and solidity with comparatively light weight, the strains of drawing and cutting being taken upon the connecting rods, and not passing in any way through the frame of the press itself, this construction of course greatly reducing the necessary strength of framing, and consequently lightening the press. In making ordinary work the blank is cut and formed at a single operation. The lower slide or die holder is carried or rests upon the cam A on the main shaft, and rises or falls as the cam revolves. This cam is so made that when the slide is raised to the proper height after cutting the blank, there is a dwell of sufficient length to enable the upper slide or plunger E to force the blank into shape. On the main shaft B two cranks are formed, which are connected by the rods D D to the upper cross head G. The motions of these cranks are thus communicated to the cross-head, which in turn raises and lowers the plunger E and the blank holder H. The upper and lower slides are adjusted by means of Stiles' patent eccentric adjustment, which enables the press to be set with the greatest accuracy for different thicknesses of metal. J is the balance wheel and driving pulley, and is connected to the press by a friction

blanks, will not of itself make any money for an establishment, but when money is lost, no inquiry as to where it has gone, or by what way or on what job it went, can have too many helps in its prosecution. The systematic record in this way of daily advance, or of expenses incurred on a job, affords the very best means yet devised for tracing losses that have been made, so far as the work of the shop is concerned. By a very natural inference it must follow that a system of record which will trace losses usefully will prevent them, if applied with intelligence as the work progresses; for then, by daily comparison one day with another, the foreman or manager can trace promptly any tendency toward the losing side of the account.

No one can say just what form of blanks would be most useful to any shop, without knowing somewhat in detail the working which is to be recorded, but useful hints may be obtained from the various forms which have already been shown in print. Even without such help nearly every manager, who will give careful attention to the subject, will find the task of devising such forms a most instructive lesson in the details of his own business. If one has a friendly acquaintance with the auditor of some well-managed railroad, a world of useful knowledge upon the general subject can be gleaned from him, and from the blanks which, in wide variety, he will be found to use, even for records that appear to be wholly trifling or absurd.

The objections sometimes raised against the use of such helps in business operations are not unlike those urged against the statement of calculations or operations in figures in algebraic language, as if one had an insurmountable and dreadful task in learning to understand and to use it. Men soberly claim that "there is no x y z in their work" itself, and hence there should be none, or need be none, in any figuring or calculation referring to it. This is only another way of saying that though some kinds of useful work may be done by a man who can neither read nor write, yet when comparisons are to be made between two pieces of his work already finished, or for preparation for some new similar work, this man, who can neither read nor write, shall be entitled to insist that these

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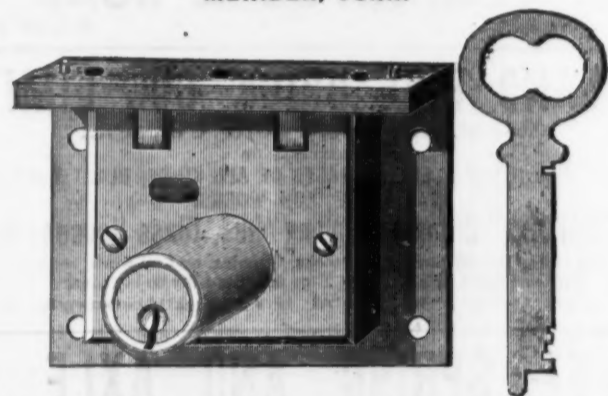
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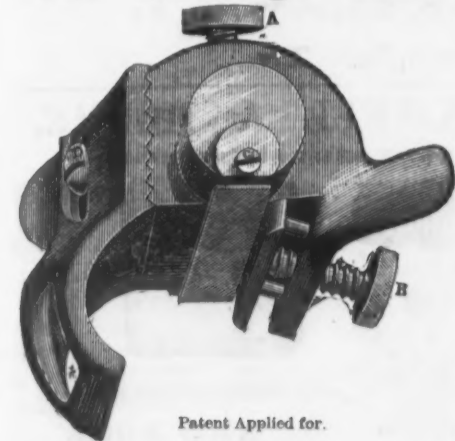
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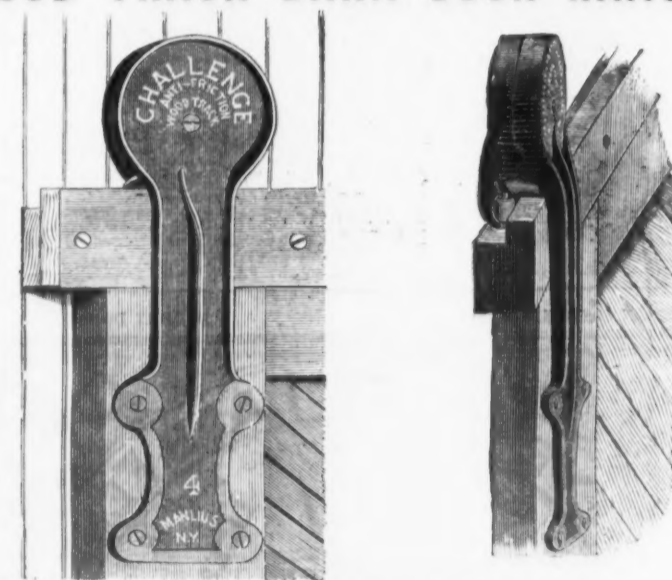
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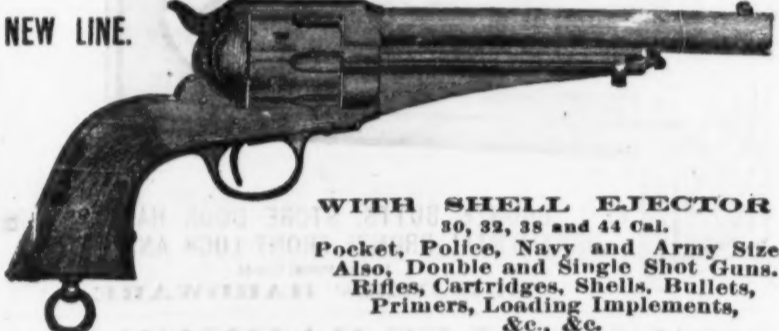
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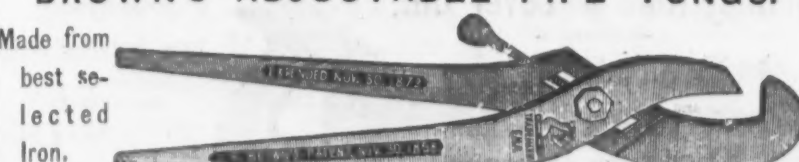
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Galvanized. 10 to 12 in. 24.00 25.00

All Mandrel Drawn Tubes under 1/2 in. 25 cents per pound advance.

IRON TUBING—dis. 2 1/2 in.

IRON TUBING—dis. 3 in.

IRON TUBING—dis. 3 1/2 in.

IRON TUBING—dis. 4 in.

IRON TUBING—dis. 4 1/2 in.

IRON TUBING—dis. 5 in.

IRON TUBING—dis. 5 1/2 in.

IRON TUBING—dis. 6 in.

IRON TUBING—dis. 6 1/2 in.

IRON TUBING—dis. 7 in.

IRON TUBING—dis. 7 1/2 in.

IRON TUBING—dis. 8 in.

IRON TUBING—dis. 8 1/2 in.

IRON TUBING—dis. 9 in.

IRON TUBING—dis. 9 1/2 in.

IRON TUBING—dis. 10 in.

IRON TUBING—dis. 10 1/2 in.

IRON TUBING—dis. 11 in.

IRON TUBING—dis. 11 1/2 in.

IRON TUBING—dis. 12 in.

IRON TUBING—dis. 12 1/2 in.

IRON TUBING—dis. 13 in.

IRON TUBING—dis. 13 1/2 in.

IRON TUBING—dis. 14 in.

IRON TUBING—dis. 14 1/2 in.

IRON TUBING—dis. 15 in.

IRON TUBING—dis. 15 1/2 in.

IRON TUBING—dis. 16 in.

IRON TUBING—dis. 16 1/2 in.

IRON TUBING—dis. 17 in.

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IRON TUBING—dis. 18 in.

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IRON TUBING—dis. 19 in.

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IRON TUBING—dis. 20 in.

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IRON TUBING—dis. 68 in.

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IRON TUBING—dis. 69 in.

IRON TUBING—dis. 69 1/2 in.

IRON TUBING—dis. 70 in.

IRON TUBING—dis. 70 1/2 in.

IRON TUBING—dis. 71 in.

IRON TUBING—dis. 71 1/2 in.

IRON TUBING—dis. 72 in.

IRON TUBING—dis. 72 1/2 in.

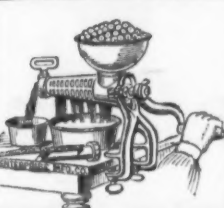

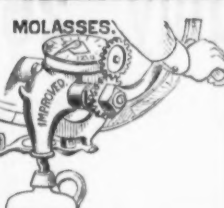
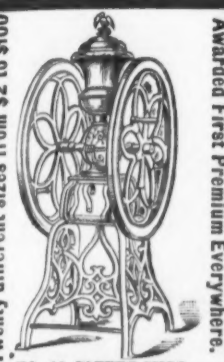

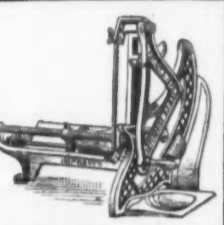
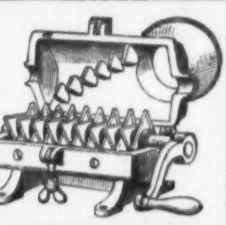

IRON TUBING—dis. 73 in.

IRON TUBING—dis. 73 1/2 in.

IRON TUBING—dis. 74 in.


IRON TUBING—dis. 74 1/2 in.

IRON TUBING—dis. 75 in.

 Fruit, Wine & Jelly Press.	 SAUSAGE STUFFER.	 Self-Measuring Faucet.
 NO. 20 COFFEE MILL. Twenty different sizes from \$2 to \$100. Awarded First Premium Everywhere.	ENTERPRISE MANUFACTURING CO. OF PA., THIRD & DAUPHIN STS., PHILADELPHIA, PA.	
	 Tincture Presses, Self-Weighing Cheese Knife, Cork Presses. THE BEST ARE THE CHEAPEST.	
 Smoked Beef Shaver.	 SAUSAGE CUTTER.	 Tobacco & Root Cutter.

MRS. POTTS'
Cold Handle Double Pointed Sad Irons.
SOLD BY HARDWARE DEALERS.
SEND FOR ILLUSTRATED CATALOGUE, FREE.

Terry's WROUGHT Iron



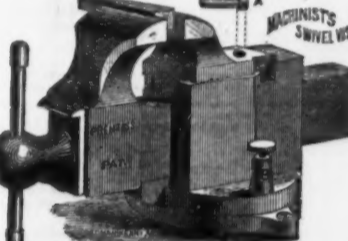
BARN DOOR HANGER & RAIL

The BEST Hanger and Rail in the market. Will not break; cannot get off the track.
As cheap as the best cast iron.

Snow and Ice cannot lodge on the Rail.

Write for Circulars.
HENRY B. NEWHALL is Agent for our Hangers in New York City.

TERRY MFG. CO., Dundee, N. Y.



PRENTISS' PAT. VISES,
Adjustable Jaw.
Stationary or Pat. Swivel Bottoms.
ADAPTED TO ALL KINDS OF VISE WORK. ALSO
"PEERLESS" SWIVEL PIPE GRIP,
FITS ANY VISE. SOLD BY THE TRADE.
PRENTISS VISE CO.,
93 Day Street, New York.
SOLE PROPRIETORS. SEND FOR CIRCULAR

THE CLARK MFG CO. MANUFACTURERS OF BUILDERS' HARDWARE BUFFALO, N. Y.


THE STANLEY WORKS,
MANUFACTURERS OF
Wrought Iron Butts, Hinges
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DOOR BOLTS,
Plain, Japanned, Bronzed and Plated.
FACTORIES: New Britain, Connecticut. **WAREHOUSE:** 79 Chambers St., New York.

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MANUFACTURERS OF
Horse, Mule & Snow Shoes of the Perkins Pattern.
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F. W. CARPENTER, President C. H. PERKINS, Gen'l Manager. R. W. COMSTOCK, Secretary



Bemis & Call Hardware & Tool Co.
PATENT COMBINATION WRENCH.
These Wrenches are made from the best of Wrought Iron, with Steel Head and Jaw, case-hardened throughout, and not only combine all of the superior qualities of our Cylinder or Gas Pipe Wrenches, but also all requisite combinations of a regular Nut Wrench thus making a combination which has no equal.
For Circulars and Price List, address
BEMIS & CALL HARDWARE & TOOL COMPANY, Springfield, Mass.

The "Eureka" Pipe Cutter



THE BODY—is fitted with an adjustable Cast-Steel Jaw at the point where it comes in contact with the Pipe, which Jaw can be renewed at any time by simply removing one screw. By this system the wearing away of the Jaw (which in other cutters is the first part to give out) is effectually prevented, and this tool can be kept in first-class order at all times.

THE WHEEL BLOCK.—This is also of Steel, neatly fitted to its socket and cannot be dropped out. It is much more durable than the cast-iron blocks and is hardened at the point where the rod comes in contact with it.

THE HANDLE—of this Cutter is put on to stay, and cannot be removed by the roughest usage, as it is an iron handle, cast fast to the Rod, operating the block.

—MANUFACTURED BY—

Pancoast and Maule 243 & 245 SOUTH THIRD STREET PHILADA.



Railroad, Wagon, Box and Other TRUCKS,
Made in all Varieties and Sizes,
Timber Well Seasoned, Well Ironed and Substantially Framed.
Please send for Prices and Sample Orders. A trial will secure your custom.
Price Lists of Scales and Testing Machines furnished free upon application.

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SHEPHERD SAW WORKS.
SPECIALTY: LARGE CIRCULAR SAWS. SOLE MANUFACTURERS OF THE GENUINE SILVER STEEL DIAMOND X CUT SAW
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STEPHENS PATENT VISE.
The most durable, and the only solid quick-working Vise, with automatic taper jaw attachment.
Will very soon pay for itself, in saving of time and labor.
For sale by the trade.
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PROPRIETOR OF
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MANUFACTURER OF
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HARDWARE COMMISSION MERCHANT.

ALL MAKES OF BARBED FENCE WIRE,
Stretchers, Diggers, Staples, &c. And
LOWE'S METALLIC PAINT,
The Great Railroad Paint.
Eastern Agent, 197 Pearl Street, New York.
Also, Boston, Philadelphia and Baltimore.

CHAMPION HOG RINGER AND HOLDER,
Only double ring ever invented. The only ring that will effectually keep Hogs from rooting. No sharp points in the nose. Use no other.
Rings 75c. Rings, 50c. 100. Holders, 75c. Hokers, 100c.
CHAMBERS, BERING & QUINLAN, Exclusive Manufacturers, Decatur, Ill.

EAGLE BILL CORN HUSKER
Is the best Husker in the market. Farmers say it is the best. Use no other.

BROWN'S HOG AND PIC RINGER AND RINGS.
Only single ring in the market that closes on the outside of the nose. No sharp points in the nose to keep it sore.

BUTLER & COLDEY MFG. CO., Limited,
MANUFACTURERS OF
Hardware and Machinist Tools,
Factory, ARLINGTON, N. J. P. O. Box 1265. Office, 97 Chambers St., NEW YORK

WILCOX & HOWE, Birmingham, Ct.,
Carriage Hardware.
(See The Iron Age first issue of each month).

PERFECTION WINDOW CLEANERS



LOOKEE! WASHEE WASHEE VELEE QUICKKEE!!!

Perfection Window Cleaners can be procured in any quantity from the leading Hardware, Woodenware and Rubber Houses of this country and Europe. Among whom are the following:

EASTERN RUBBER CO., Boston, Mass.
GOODYEAR'S RUBBER MFG. CO., N. Y. City.
ROBT. C. GEDDIS, Philadelphia, Pa.
DUNCAN & THOMPSONS, Pittsburgh, Pa.
HAMILTON & MATHEWS, Rochester, N. Y.
MCINTOSH, GOOD & HUNTINGTON, Cleveland, O.
PECK & BEMIS, Cleveland O.
CREIGHTON & SON, Louisville, Ky.
KIPP BROS., Indianapolis, Ind.
FELIX, MARSTON & BLAIR, Chicago, Ill.
GOULD, HALL & CO., Chicago, Ill.
P. N. EARLE & CO., Chicago, Ill.
GOODYEAR RUBBER CO., (and Branches) Chicago, Ill.
SIMMONS HARDWARE CO., St. Louis, Mo.
HALL & WILLIS HDW. CO., Kansas City, Mo.
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Dealers will be careful to ask for the Perfection Window Cleaner, and take no other, as all others are infringements which we shall promptly suppress. See that all have two rubbers and bear our name and date of patents.

PERFECTION WINDOW CLEANER CO.,
232 La Salle St., CHICAGO, ILL.

GRAY IRON CASTINGS.
JOHN KEPPELMAN, Reading, Pa.,
Herewith gives notice that he has opened a Jobbing Foundry, and is ready to receive orders for all kinds of Light Gray Iron Castings; also, for every description of Machinery. Orders promptly filled. Please address
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Grindstones, Emery, &c.

Walter R. Wood, GRINDSTONES.
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283 and 285 Front Street, New York.

GEO. CHASE,
The largest manufacturers in the world of
OIL STONE
Of all description.
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Send for Illustrated Price List. NEW YORK



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ALL SIZES & GRITS
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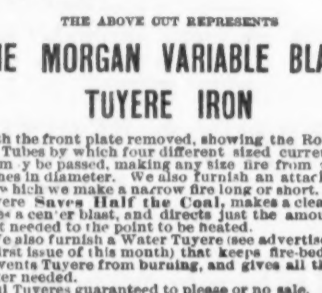
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Of All Kinds.
127 Superior Street, CLEVELAND, OHIO.
LOMBARD & CO.,
Imports and Dealers in all kinds of
GRINDSTONES,
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Stones for Millstones, Carpenters, Farmers and Glass Cutters on hand and cut to order.

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Townsend's Patent.....\$6.00 7 doz, dis 33 1/3 %
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THE MORGAN VARIABLE BLAST-TUYERE IRON

With the front plate removed, showing the Rotating Air Tubes by which four different sized currents of air may be passed, making any size fire from 3 to 18 inches in diameter. We also furnish an attachment by which we make a narrow fire long or short. This Tuyere Saves Half the Coal, makes a clean fire, gives a con or blast, and directs just the amount of heat needed to the point to be heated.

We also furnish a Water Tuyere (see advertisement in first issue of this month) that keeps fire-bed cool, prevents Tuyers from burning, and gives all the hot water needed.

All Tuyers guaranteed to please or no sale.
 Special inducement to the trade. Catalogues sent free. Address

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\$50 A DAY GUARANTEED

THIS RUBBER MAKES A WELL SET

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15 FT. PER HOUR

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The Iron-Masters' LABORATORY.

Exclusively for the

Analysis of Ores of Iron, Pig and Manufactured Iron, Steels, Limestone, Clays, Slags and Coal for Practical Metallurgical Purposes.

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 With Branch at Warrenton, Virginia,
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For determining the per cent. of Pure Iron in an ordinary Ore..... \$4.00
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 For the per cent. of Water, Volatile Combustible Matter, fixed Carbon, and Ash in Coal..... 12.50

For determining the constituents of a Clay, Slag, Coke, or of an Ash in Coal the charges will correspond with those for the constituents of an ore.
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Printed instructions for obtaining proper average samples for analysis furnished upon application

Handles and Rims.




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SAMUEL MUSSELMAN & SON,
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 Manufacturer of
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LEVER Lemon Squeezer,



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MOORE'S DIFFERENTIAL PULLEY BLOCKS, MOORE'S HAND HOISTS, &c.



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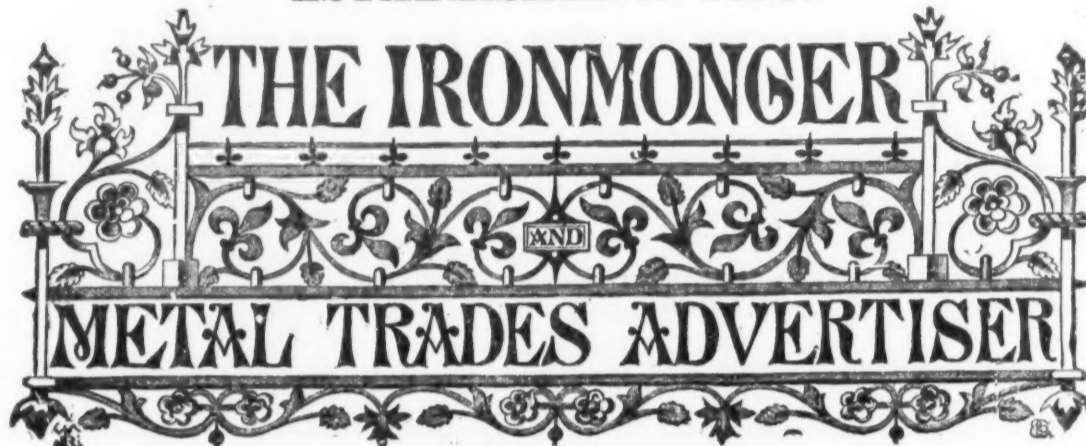
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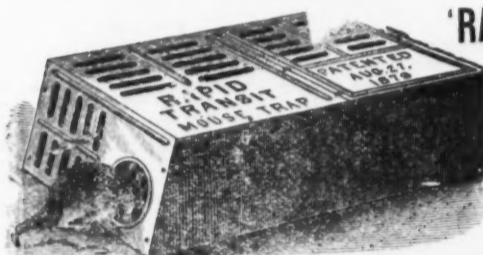
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21 G. 24 G. 28 G. 32 G. 36 G. 40 G. 44 G. 48 G. 52 G. 56 G. 60 G. 64 G. 68 G. 72 G. 76 G. 80 G. 84 G. 88 G. 92 G. 96 G. 100 G. 104 G. 108 G. 112 G. 116 G. 120 G. 124 G. 128 G. 132 G. 136 G. 140 G. 144 G. 148 G. 152 G. 156 G. 160 G. 164 G. 168 G. 172 G. 176 G. 180 G. 184 G. 188 G. 192 G. 196 G. 200 G. 204 G. 208 G. 212 G. 216 G. 220 G. 224 G. 228 G. 232 G. 236 G. 240 G. 244 G. 248 G. 252 G. 256 G. 260 G. 264 G. 268 G. 272 G. 276 G. 280 G. 284 G. 288 G. 292 G. 296 G. 300 G. 304 G. 308 G. 312 G. 316 G. 320 G. 324 G. 328 G. 332 G. 336 G. 340 G. 344 G. 348 G. 352 G. 356 G. 360 G. 364 G. 368 G. 372 G. 376 G. 380 G. 384 G. 388 G. 392 G. 396 G. 400 G. 404 G. 408 G. 412 G. 416 G. 420 G. 424 G. 428 G. 432 G. 436 G. 440 G. 444 G. 448 G. 452 G. 456 G. 460 G. 464 G. 468 G. 472 G. 476 G. 480 G. 484 G. 488 G. 492 G. 496 G. 500 G. 504 G. 508 G. 512 G. 516 G. 520 G. 524 G. 528 G. 532 G. 536 G. 540 G. 544 G. 548 G. 552 G. 556 G. 560 G. 564 G. 568 G. 572 G. 576 G. 580 G. 584 G. 588 G. 592 G. 596 G. 600 G. 604 G. 608 G. 612 G. 616 G. 620 G. 624 G. 628 G. 632 G. 636 G. 640 G. 644 G. 648 G. 652 G. 656 G. 660 G. 664 G. 668 G. 672 G. 676 G. 680 G. 684 G. 688 G. 692 G. 696 G. 700 G. 704 G. 708 G. 712 G. 716 G. 720 G. 724 G. 728 G. 732 G. 736 G. 740 G. 744 G. 748 G. 752 G. 756 G. 760 G. 764 G. 768 G. 772 G. 776 G. 780 G. 784 G. 788 G. 792 G. 796 G. 800 G. 804 G. 808 G. 812 G. 816 G. 820 G. 824 G. 828 G. 832 G. 836 G. 840 G. 844 G. 848 G. 852 G. 856 G. 860 G. 864 G. 868 G. 872 G. 876 G. 880 G. 884 G. 888 G. 892 G. 896 G. 900 G. 904 G. 908 G. 912 G. 916 G. 920 G. 924 G. 928 G. 932 G. 936 G. 940 G. 944 G. 948 G. 952 G. 956 G. 960 G. 964 G. 968 G. 972 G. 976 G. 980 G. 984 G. 988 G. 992 G. 996 G. 1000 G.

\$1.50 to \$25.00. \$25.00 and \$50.00. \$75.00 and \$100.00.

SPECIAL ATTENTION GIVEN TO EXPORT ORDERS.

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White Mountain Freezer to all per-
sons in the world for the following rea-
sons: We have used them; they freeze
quicker than any other; they save time,
salt and ice; the triple motion makes
smooth cream without lumps; makes
more of it; galvanized iron outside; tin
inside; no zinc in contact with the
cream; easily adjusted; substantially
made; simple in construction; perfect
in results. Send for descriptive circular
and discount of this celebrated Freezer.
Address,
Nashua, N. H., U. S. A.

White Mountain Freezer Co.,

Nashua, N. H., U. S. A.

BEECHER & PECK,

Successors to Milo Peck, Manufacturers of



PECK'S DROP LIFTER is the only one which has its parts
cushioned. Being thus cushioned they are the most durable Lifter in
the market.

Can be attached to any drop now in use.

Send for Illustrated Catalogue.

Cor. Lloyd and River Sts.,

New Haven, Conn.

PURE TURKISH EMERY,
EXCELSIOR POLISH, METAL POLISH, QUARTZ, PUMICE, AND ROTTEN STONE, CROCUS, ROUGE, GLUE SAND PAPER, EMERY PAPER, AND CLOTH, EMERY WHEELS, & C. G.
WALPOLE EMERY MILLS,
MILLS, SO. WALPOLE. 114 MILK ST. BOSTON, MASS.

THE MOUNT CARMEL OX SHOE.



Steel Toe Calk.
FINISHED READY FOR NAILING ON.
WARRANTED

The Best and Cheapest Shoe Made.
IVES, WOODRUFF & CO.

Manufacturers,
MOUNT CARMEL, CONN.
For sale by dealers in blacksmiths' supplies.

NOVELTY IRON FOUNDRY. HAIGHT & CLARK, 16 & 18 De Witt St., Albany, N. Y.

Manufacturers of
FINE GRAY IRON CASTINGS OF EVERY DESCRIPTION.
Rosettes and Pickets for Wire Workers. Castings for Furniture and Piano
Manufacturers. Iron and Metal Patterns of all kinds a specialty.
Correspondence solicited for JAPANNING, COPPERING, BRONZING.

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Corrected Weekly by Lloyd, Supplee & Walton.
Terms, 30 days. For 60 or 90 days, interest added at 1%
per cent. per annum.

Anvils.
Peter Wrights, # 10.....10 1/2
Over 20 lbs.....10 1/2
Trenton.....10 1/2
Apple Parers.
Globe Apple Parer.....\$6.00 net
Pean Apple Parer.....\$6.00 net
Lots or 10 to 25 dozen special prices.
Ray State Peach Parer.....\$6.00

Axes.
Hunt's Kentucky and Yankee, per doz \$10.00 (10 1/2)
Robert Mann.....\$8.00 (8 1/2)
Richland Chief.....\$8.50 (9)
Beveled Axes.....\$10.00 (10 1/2)
Double Bit Axes.....\$10.00 (10 1/2)

Augers and Auger Bits.—New List January 7, 1882.
Bates' Nut Augers.....\$10.00 (10 1/2)
Cook's Augers.....\$10.00 (10 1/2)
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Benjamin Pierce Auger Bits.....\$10.00 (10 1/2)
Griswold Auger Bits.....\$10.00 (10 1/2)
Cook's.....\$10.00 (10 1/2)
Jennings'.....\$10.00 (10 1/2)
Bonney's Pat. Hol. Augers, list \$10.00 (10 1/2)
Bonney's Pat. Hol. Augers, list \$10.00 (10 1/2)

Balances.
Light and Common.....\$10.00 (10 1/2)

Bells.
Bavin Bros. Mfg. Co. Light Hand Bells.....\$10.00 (10 1/2)
Swiss Pattern Hand Bells.....\$10.00 (10 1/2)
Connell's Door Bells.....\$10.00 (10 1/2)
St. Western & Kentucky Cow, new list.....\$10.00 (10 1/2)

Boring Machines.
Upright, without Augers.....\$10.00 (10 1/2)
Angular, without Augers.....\$10.00 (10 1/2)
Bolts.—Eastern Carriage Bolts.....\$10.00 (10 1/2)
Philadelphia.....\$10.00 (10 1/2)
Stanley, Wrought Shutter.....\$10.00 (10 1/2)

Braces.—Barber's.....\$10.00 (10 1/2)
Backus.....\$10.00 (10 1/2)
Boydell.....\$10.00 (10 1/2)
American Ball.....\$10.00 (10 1/2)

Butts.—Cast Fast Joint, Narrow.....\$10.00 (10 1/2)
Broad.....\$10.00 (10 1/2)
Cast Loose Joint, Narrow.....\$10.00 (10 1/2)
Broad.....\$10.00 (10 1/2)
Acorn Loose Joint.....\$10.00 (10 1/2)
Mayer's Loose Joint.....\$10.00 (10 1/2)
Wrought Loose Pin.....\$10.00 (10 1/2)
Table Hinges and Back Flaps.....\$10.00 (10 1/2)
Loose Joint.....\$10.00 (10 1/2)

Blind Butts.
Parker.....\$10.00 (10 1/2)
Clark.....\$10.00 (10 1/2)
Shepard.....\$10.00 (10 1/2)
Lull & Porter.....\$10.00 (10 1/2)
Butler's.....\$10.00 (10 1/2)

Chains.—German Halter and Coll. list December 31, 1881.....\$10.00 (10 1/2)
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Chisels.—Socket Framing.....\$10.00 (10 1/2)
Socket Firmer.....\$10.00 (10 1/2)
Butcher's.....\$10.00 (10 1/2)
Cutters.—Bed (new list July 1, 1882).....\$10.00 (10 1/2)
Plate.....\$10.00 (10 1/2)

Coffee Mills.—Box and Side, new list Jan. 1, 1882.....\$10.00 (10 1/2)
Enterprise.....\$10.00 (10 1/2)
Cutlery.—Walden Pocket.....\$10.00 (10 1/2)
Penna. Knife Co.....\$10.00 (10 1/2)
Landers, Frary & Clark, J. Russell & Co., Landers & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.....\$10.00 (10 1/2)
Adjustable Handle.....\$10.00 (10 1/2)

Fry Pans.
Tinned.....\$10.00 (10 1/2)
No. 1.....\$10.00 (10 1/2)
No. 2.....\$10.00 (10 1/2)
No. 3.....\$10.00 (10 1/2)
No. 4.....\$10.00 (10 1/2)
No. 5.....\$10.00 (10 1/2)
No. 6.....\$10.00 (10 1/2)
No. 7.....\$10.00 (10 1/2)
No. 8.....\$10.00 (10 1/2)
No. 9.....\$10.00 (10 1/2)
No. 10.....\$10.00 (10 1/2)

Files.
Nicholson.....\$10.00 (10 1/2)
Diston.....\$10.00 (10 1/2)
Butcher.....\$10.00 (10 1/2)

Fluting Machines.
Eagle.....\$10.00 (10 1/2)
Crown.....\$10.00 (10 1/2)
Crown.....\$10.00 (10 1/2)
Crown.....\$10.00 (10 1/2)
Crown.....\$10.00 (10 1/2)

Geneva Flutes.
Geneva Flute.....\$10.00 (10 1/2)
Favorite com. Flute & Sd Iron.....\$10.00 (10 1/2)

Hammers.
Yerkes & Plumb's, new list.....\$10.00 (10 1/2)
Maydole Hammers.....\$10.00 (10 1/2)
Bowling A. E. Nali Hammers.....\$10.00 (10 1/2)

Hand Tools.
Diston Loop Handles Crosscut.....\$10.00 (10 1/2)
Boynton Loop Handles Crosscut.....\$10.00 (10 1/2)
Hatchets.
Yerkes & Plumb, new list.....\$10.00 (10 1/2)
Stunt.....\$10.00 (10 1/2)

Hinges.
Strap and T.....\$10.00 (10 1/2)
Iron Nails.
Ausable.....\$10.00 (10 1/2)
Pooled & P'd.....\$10.00 (10 1/2)

Locks and Keys.
Yerkes & Plumb, new list.....\$10.00 (10 1/2)
American Padlocks.....\$10.00 (10 1/2)
Scandinavian Padlocks.....\$10.00 (10 1/2)

Lanterns.
Buckeye.....\$10.00 (10 1/2)
Tubular.....\$10.00 (10 1/2)
Globe, 3 cents extra per doz. net.

Lawn Mowers.
Philadelphia.....\$10.00 (10 1/2)
Excelsior.
Lawn and Garden.....\$10.00 (10 1/2)
Lawn and Garden.....\$10.00 (10 1/2)

Machetes.
Long and Short Cutter.....\$10.00 (10 1/2)
Pennsylvania Pattern.....\$10.00 (10 1/2)

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Enterprise.....\$10.00 (10 1/2)
Lincoln's.....\$10.00 (10 1/2)
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Ment Cutters.
Dixon's.....\$10.00 (10 1/2)
Woodruff.....\$10.00 (10 1/2)
Riwe.....\$10.00 (10 1/2)

Picks.—New list.....\$10.00 (10 1/2)
Razor Straps.
Lamont Combination.....\$10.00 (10 1/2)
Imitation Emerson.....\$10.00 (10 1/2)

Reapers.
Stanley Boxwood.....\$10.00 (10 1/2)
Stanley Iron.....\$10.00 (10 1/2)
Steel Yards.—Hart's Pattern.....\$10.00 (10 1/2)

Squares.
Steel and Iron.....\$10.00 (10 1/2)
Try Squares, Stanley.....\$10.00 (10 1/2)
Diston's Try Squares.....\$10.00 (10 1/2)

Scythes.
Golden Clipper, Damascus Blade, Boxed and Sharpened.....\$10.00 (10 1/2)
Clipper No. 10, Boxed and Sharpened.....\$10.00 (10 1/2)
Sharpened.....\$10.00 (10 1/2)
Sharpened.....\$10.00 (10 1/2)

Saws.—Diston's Hand, Panel and Rip.....\$10.00 (10 1/2)
Diston's Circular.....\$10.00 (10 1/2)
Cross-Cut No. 2, Plain Tooth.....\$10.00 (10 1/2)
Patent Tooth.....\$10.00 (10 1/2)

**Boydell's Lightning Cross Cut, new list.....\$10.00 (10 1/2)
Lightning Buck Saws, cross bar.....\$10.00 (10 1/2)
Oliver Ames & Sons, new list.....\$10.00 (10 1/2)
Griffiths.....\$10.00 (10 1/2)**

**Rowland.....\$10.00 (10 1/2)
Mad Irons.....\$10.00 (10 1/2)
Mrs. Potter's Patent.....\$10.00 (10 1/2)
Saw.....\$10.00 (10 1/2)**

**Wadita Extra.....\$10.00 (10 1/2)
No.....\$10.00 (10 1/2)
No.....\$10.00 (10 1/2)
No.....\$10.00 (10 1/2)**

**Kindston Oil.....\$10.00 (10 1/2)
Azo Stone.....\$10.00 (10 1/2)
Slip.....\$10.00 (10 1/2)**

Screws.
Flat Head Iron.....\$10.00 (10 1/2)
Round Head Iron.....\$10.00 (10 1/2)
Iron.....\$10.00 (10 1/2)

Spools.
Plated.....\$10.00 (10 1/2)
German Silver.....\$10.00 (10 1/2)
Britannia, Boardman's.....\$10.00 (10 1/2)
Parker's.....\$10.00 (10 1/2)

Tinned.
Spring.....\$10.00 (10 1/2)
Gem No. 3 small Jap'd.....\$10.00 (10 1/2)
No. 2 medium Jap'd.....\$10.00 (10 1/2)
Coll No. 10, per gross net.....\$10.00 (10 1/2)
Warner Door Springs, per doz. net.....\$10.00 (10 1/2)
Standard Spring Hinges.....\$10.00 (10 1/2)

Stocks and Dies.
Stove Polish.....\$10.00 (10 1/2)
Dixon.....\$10.00 (10 1/2)
Fire Fly.....\$10.00 (10 1/2)

Tacks.
Shoe Nails.....\$10.00 (10 1/2)
Double Pointed Tacks.....\$10.00 (10 1/2)

Traps.
Genuine Oneida.....\$10.00 (10 1/2)
Im. Oneida.....\$10.00 (10 1/2)
Vices.....\$10.00 (10 1/2)
Wrenches.....\$10.00 (10 1/2)
Cone.....\$10.00 (10 1/2)
Mechanics.....\$10.00 (10 1/2)
Mail Bar.....\$10.00 (10 1/2)

Wire.
Bright or Ann'd, No. 10 to 18.....\$10.00 (10 1/2)
No. 19 to 26.....\$10.00 (10 1/2)
No. 27 to 36.....\$10.00 (10 1/2)
Coppered, 10 to 18.....\$10.00 (10 1/2)
Tinned Broom Wire.....\$10.00 (10 1/2)
Galvanized Broom Wire.....\$10.00 (10 1/2)
Painted Barb Wire.....\$10.00 (10 1/2)
Galvanized No. 7 to 18.....\$10.00 (10 1/2)
Wringers.....\$10.00 (10 1/2)
Twines.....\$10.00 (10 1/2)
Novelty, No. 10.....\$10.00 (10 1/2)

PITTSBURGH.

Merchant Iron.
Terms.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

For fluctuations and discounts on card rates see weekly Pittsburgh Trade Report.

The following are card rates.

Flat Bar.
14 to 16 by 1/2 to 1 inch.....\$10.00 (10 1/2)
14 to 16 by 1/2 to 1 inch.....\$10.00 (10 1/2)
14 to 16 by 1/2 to 1 inch.....\$10.00 (10 1/2)
14 to 16 by 1/2 to 1 inch.....\$10.00 (10 1/2)

Rounds and Squares.
1 to 1 1/2.....\$10.00 (10 1/2)
1 to 1 1/2.....\$10.00 (10 1/2)
1 to 1 1/2.....\$10.00 (10 1/2)
1 to 1 1/2.....\$10.00 (10 1/2)

Oval Iron.
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)

Half Oval and Half Round.
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)

Wagon Box Iron.
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)

Heavy Bands.
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)

Light Bands.
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)

Iron.
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14 to 16.....\$10.00 (10 1/2)
14 to 16.....\$10.00 (10 1/2)

Nails.
See Pittsburgh Trade Report.

Best Quality Refined Cast Steel.
Square, Flat, Octagon and Round.

1 1/2 to 2 inches, inclusive.....\$10.00 (10 1/2)
2 to 3 inches.....\$10.00 (10 1/2)
3 to 4 inches.....\$10.00 (10 1/2)
4 to 5 inches.....\$10.00 (10 1/2)
5 to 6 inches.....\$10.00 (10 1/2)
6 to 7 inches.....\$10.00 (10 1/2)
7 to 8 inches.....\$10.00 (10 1/2)
8 to 9 inches.....\$10.00 (10 1/2)
9 to 10 inches.....\$10.00 (10 1/2)
10 to 11 inches.....\$10.00 (10 1/2)
11 to 12 inches.....\$10.00 (10 1/2)
12 to 13 inches.....\$10.00 (10 1/2)
13 to 14 inches.....\$10.00 (10 1/2)
14 to 15 inches.....\$10.00 (10 1/2)
15 to 16 inches.....\$10.00 (10 1/2)
16 to 17 inches.....\$10.00 (10 1/2)
17 to 18 inches.....\$10.00 (10 1/2)
18 to 19 inches.....\$10.00 (10 1/2)
19 to 20 inches.....\$10.00 (10 1/2)
20 to 21 inches.....\$10.00 (10 1/2)
21 to 22 inches.....\$10.00 (10 1/2)
22 to 23 inches.....\$10.00 (10 1/2)
23 to 24 inches.....\$10.00 (10 1/2)
24 to 25 inches.....\$10.00 (10 1/2)
25 to 26 inches.....\$10.00 (10 1/2)
26 to 27 inches.....\$10.00 (10 1/2)
27 to 28 inches.....\$10.00 (10 1/2)
28 to 29 inches.....\$10.00 (10 1/2)
29 to 30 inches.....\$10.00 (10 1/2)
30 to 31 inches.....\$10.00 (10 1/2)
31 to 32 inches.....\$10.00 (10 1/2)
32 to 33 inches.....\$10.00 (10 1/2)
33 to 34 inches.....\$10.00 (10 1/2)
34 to 35 inches.....\$10.00 (10 1/2)
35 to 36 inches.....\$10.00 (10 1/2)
36 to 37 inches.....\$10.00 (10 1/2)
37 to 38 inches.....\$10.00 (10 1/2)
38 to 39 inches.....\$10.00 (10 1/2)
39 to 40 inches.....\$10.00 (10 1/2)
40 to 41 inches.....\$10.00 (10 1/2)
41 to 42 inches.....\$10.00 (10 1/2)
42 to 43 inches.....\$10.00 (10 1/2)
43 to 44 inches.....\$10.00 (10 1/2)
44 to 45 inches.....\$10.00 (10 1/2)
45 to 46 inches.....\$10.00 (10 1/2)
46 to 47 inches.....\$10.00 (10 1/2)
47 to 48 inches.....\$10.00 (10 1/2)
48 to 49 inches.....\$10.00 (10 1/2)
49 to 50 inches.....\$10.00 (10 1/2)

Machinery Steel.
Crucible.....\$10.00 (10 1/2)
Open Hearth.....\$10.00 (10 1/2)

Crucible Cast Steel.
Open Hearth Cast Steel.....\$10.00 (10 1/2)
Sheet Steel—Crucible.....\$10.00 (10 1/2)

Best, 3d Qual. 3d Qual. Open Hearth.
To 1 gauge, 1 1/2 to 2 inches.....\$10.00 (10 1/2)
To 2 gauge, 2 to 3 inches.....\$10.00 (10 1/2)
To 3 gauge, 3 to 4 inches.....\$10.00 (10 1/2)
To 4 gauge, 4 to 5 inches.....\$10.00 (10 1/2)
To 5 gauge, 5 to 6 inches.....\$10.00 (10 1/2)
To 6 gauge, 6 to 7 inches.....\$10.00 (10 1/2)
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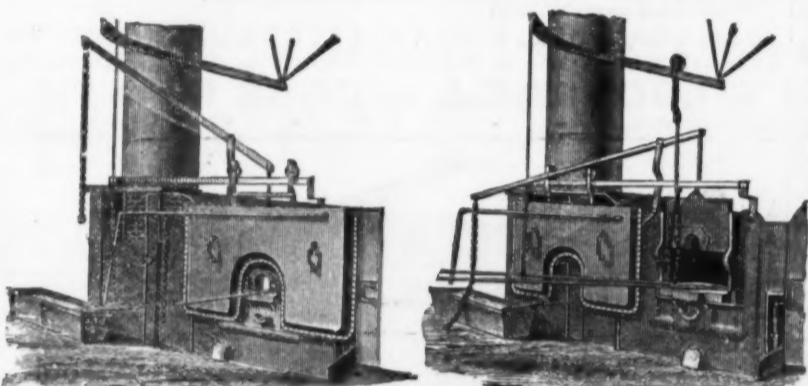
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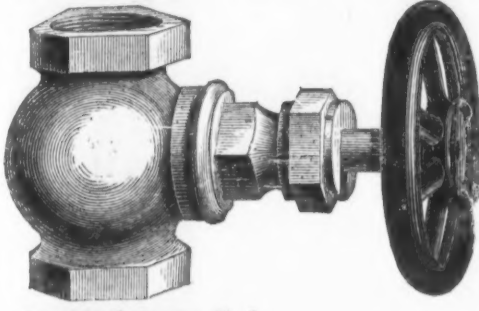
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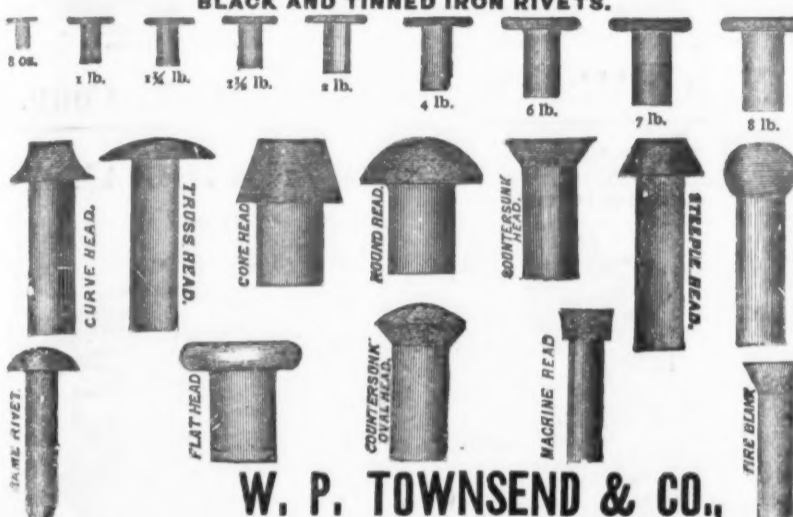
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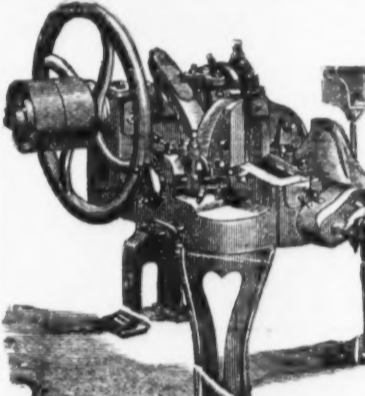
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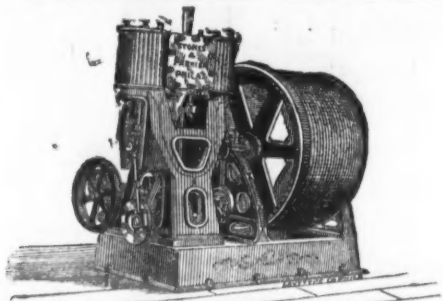
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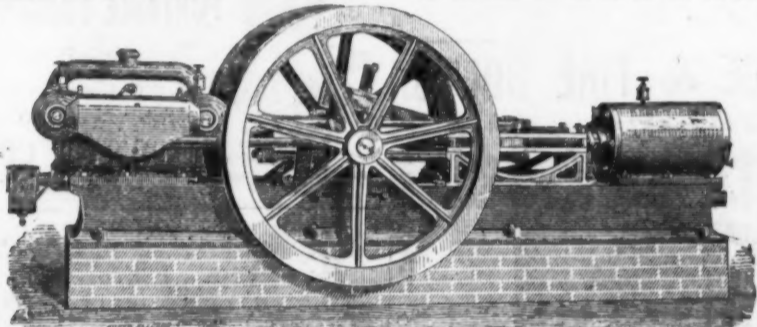
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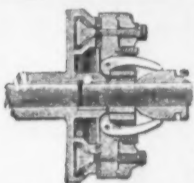
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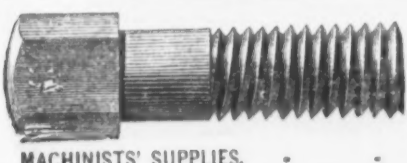
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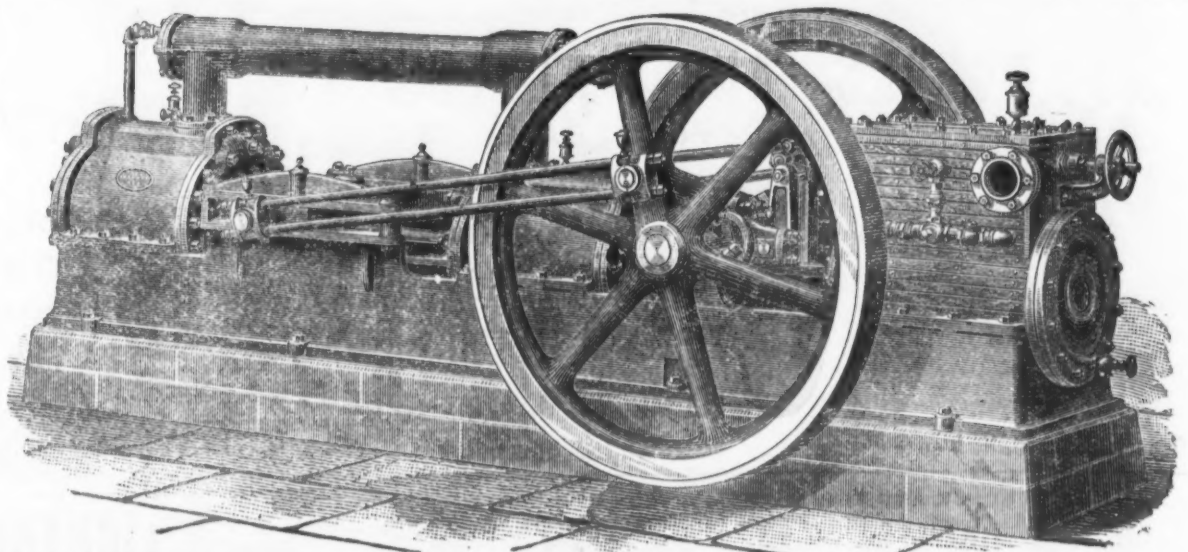


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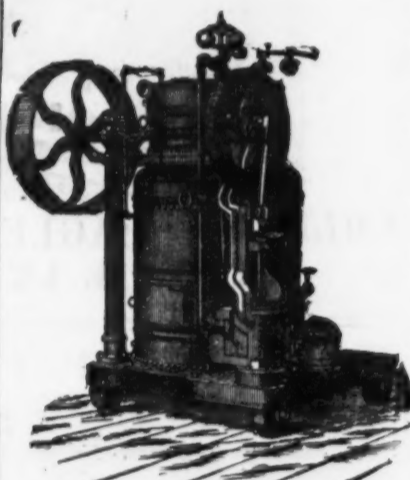
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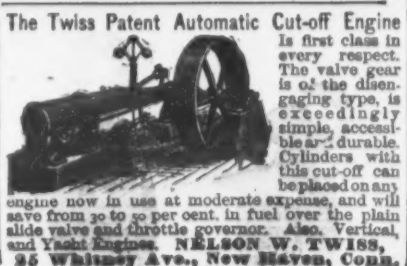
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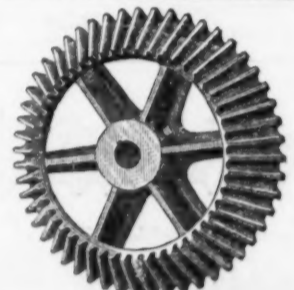
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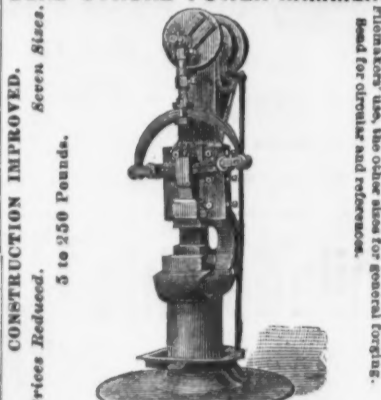
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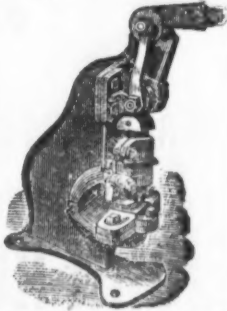
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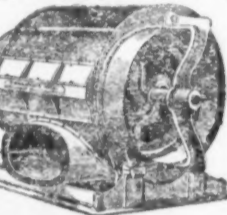


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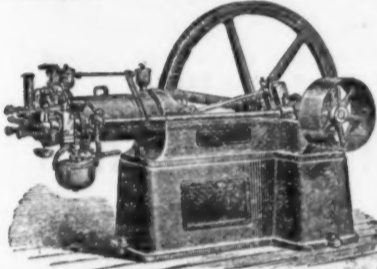
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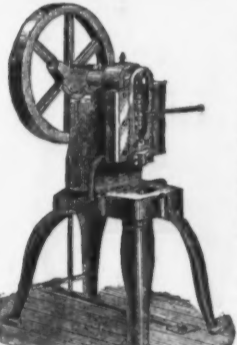
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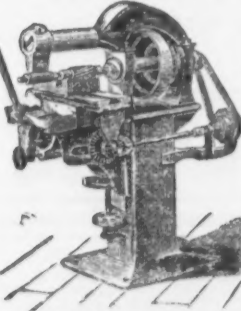
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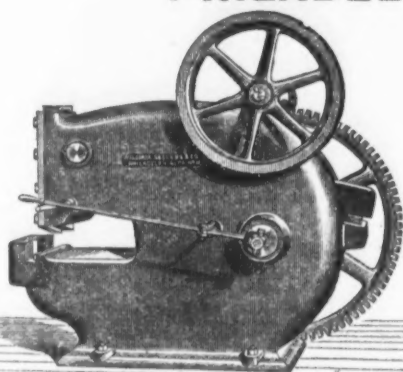
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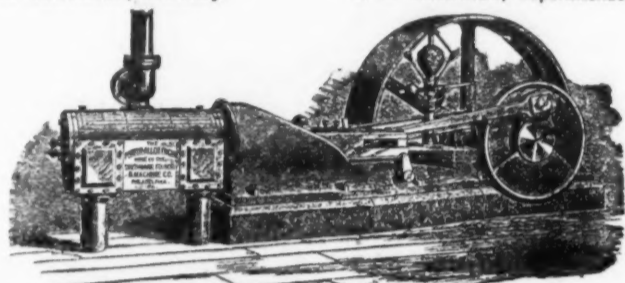
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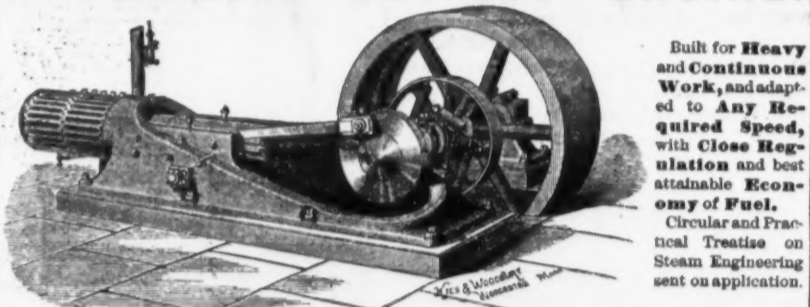
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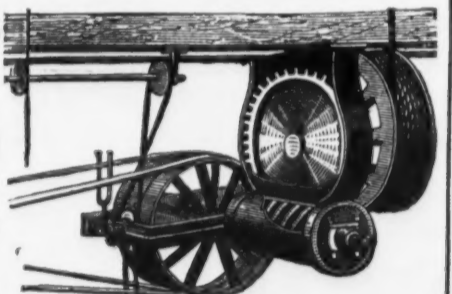
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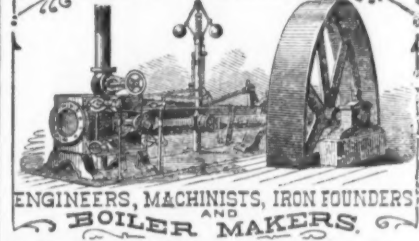


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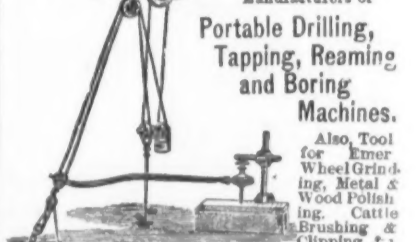
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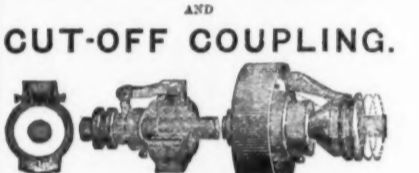
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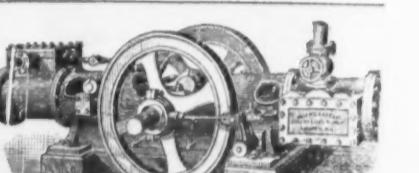
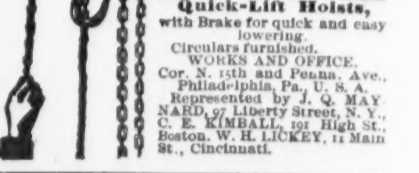
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**ALLEN'S
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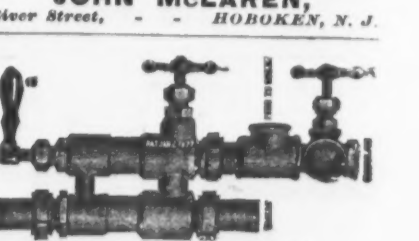
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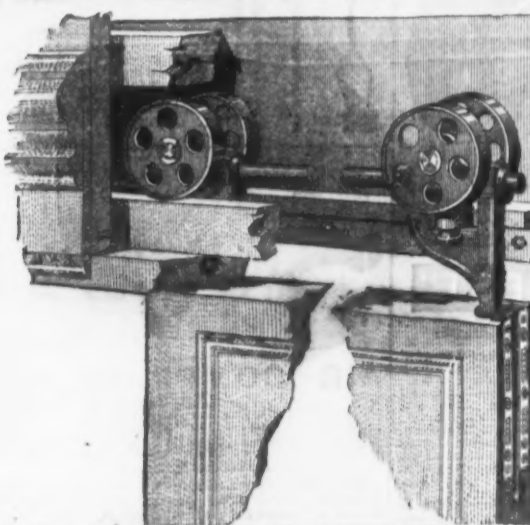
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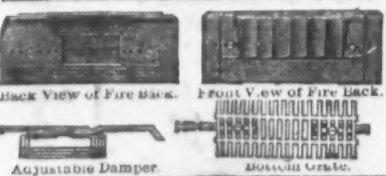
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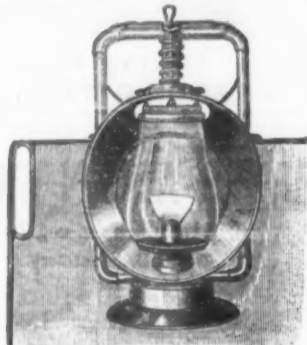
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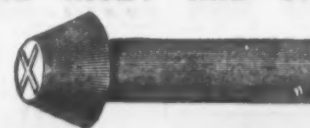
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